



Umcebisi
Business Advisers (Pty) Ltd

**Baseline Socio-Economic Assessment for the development of Aquaculture
Development Zones for Mariculture Fish Farming in Algoa Bay**

Draft Consultative Report

This report consists of 42 pages

Report prepared for CapeEAPrac (Pty) Ltd

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1. BACKGROUND

1.1 Introduction

Algoa Bay's 40 km of breathtaking coastline boasts a perfect combination of warm water and protected beaches. Algoa Bay is a large log-spiral bay, anchored by rocky headlands at Cape Recife in the south east, and Woody Cape and the Bird Island group in the northeast. The relatively large Zwartkops and Sundays Rivers and the much smaller Papenkuils and Coega Rivers discharge into the bay (CSIR, 2007, p. 11).

Algoa Bay (also known as Nelson Mandela Bay), is a favoured draw-card for beach and water sport enthusiasts and is fast becoming known as South Africa's water sport capital as it offers activities throughout the year, especially wind-surfing and fishing. In fact, Algoa Bay is regarded as one of the best sailing venues in the world, while scuba diving is of world-class quality with beautiful reefs, shipwrecks, fish and colourful coral species. A wide range of environmental conditions is monitored in Algoa Bay and Sanparks wants to establish a 120 000 ha Marine Protected Area (MPA) along the middle-eastern section of the bay.

Algoa Bay serves as the entrance to two ports nestled along the coast within the bay, namely Port Elizabeth and a new port at Ngqura (Coega) a mere 20 km away. Agriculture and farming has always played an important role in the port's activities, principally deciduous and citrus fruit and the annual wool crop. More recently, containers have assumed a prominent role in the fortunes of the harbour, with Port Elizabeth serving its local industrial base and offering an alternate port of call to container ships whenever the Durban or Cape Town container terminals are congested. Other principal products handled at the harbour include manganese ore, which is railed from the Northern Cape, and petroleum products that are imported from other South African ports. The motor industry has long been an important industrial activity for the Eastern Cape and the port plays a leading role in this regard, boasting a large open-area car terminal. The fishing industry also makes extensive use of the port.

There are no major ship repair facilities, but a slipway is available for fishing vessel repair. Passenger ships usually make use of one of the fruit terminal berths when calling at Port Elizabeth. The South African Navy has established a naval station at Port Elizabeth, but does not maintain any ships there. In future, some of the port's present commercial activity may be lost to the port of Ngqura (Coega), although the car terminal and possibly the container terminal will remain intact.

The entrance channel to Port Elizabeth is maintained at a depth of -14.5m Chart Datum and has a generous width of 310 m. Limitations on vessels using the port are 11 m draught for passenger and dry cargo vessels, 11.2 m for container ships, 12.1 m for ore carriers and 9.6m for tankers, all according to berthing. Deeper vessels may be accommodated with the permission of the harbour master. Tug assistance and pilotage is compulsory. Ships may anchor outside the port in Algoa Bay provided the approaches to the entrance channel are kept clear.

Port Elizabeth's main features are the container terminal, fruit terminal and manganese terminal. The container terminal has a capacity in excess of 375,000 TEUs and has the advantage of being able to load railway trains directly under the gantry cranes, without containers having to be double handled, thus speeding up delivery to inland destinations. A full range of ships chandelling and stevedoring as well as other support services is available (Transnet, 2011a).

The deep-sea port of Ngqura, which began commercial ship operations (containers) in October 2009, lies some 20 km northeast of Port Elizabeth at the mouth of the Coega River in Algoa Bay. An Industrial Development Zone, known as the Coega IDZ, has been developed over the 12 000 ha site in the area including the river and port, with a 4 500 ha core development immediately identified. The IDZ will serve as a primary location for new industrial development for export driven industries.

The deepwater Ngqura port is capable of serving post-Panamax dry and liquid bulkers and the new generation of cellular container ships. The port consists of a main eastern breakwater, 2.7 km in length extending into Algoa Bay to a maximum water depth of 18 metres, and a secondary western breakwater 1.125 km in length. The two



breakwaters are positioned and laid out in accordance with the requirement of an exclusion zone of some 500 m around the St Croix group of islands offshore from the port. Five berths (initially) totalling 1 800 m of quay wall - two for containers, two for dry bulk and break bulk cargo, and one for liquid bulk cargo - have been provided. A total of 32 berths have been identified in the fully developed Port with the intention of developing the port further up the Coega River valley and southwest along the coast (Transnet, 2011b).

Marine environments in general are ecologically complex and multifaceted and Algoa Bay, because of the range of environments it encompasses and the amenity uses it provides, is amongst the more complex. Areas of special interest are the abalone farm and the marine protected areas (associated with the Algoa Bay Island nature reserve). The abalone farm predates the establishment of the port and is located on the coast approximately 1.8 km north-east of the eastern breakwater of the Port of Ngqura (CSIR, 2007: p. 17)

In excess of 70 fish species inhabit Algoa Bay, none of which that could be considered as rare and/or endangered or having narrow habitat preferences. Some of these species support commercial line fishing and are the basis for a significant recreational fishery in Algoa Bay. No trawling is allowed within the confines of Algoa Bay inshore of a line extending from Cape Recife to Woody Cape. No fishing at all is permitted in the Bird Island Marine Protected area. Algoa Bay is important for commercial (and recreational) catches of squid (*Loligo vulgaris reynaudii*), a valuable fishery within the South African context (CSIR, 2007p. 18). Commercial fisheries that operate in Algoa Bay and immediately adjacent areas comprise pelagic (sardine), demersal and line fish, as well as squid (CSIR, 2007: p. 35)

The Port is also a base for exporting vehicles, manganese, fish products, scrap metal and train rails. Petroleum and related products and wheat are imported through the Port. Other activities in the port include berthing of passenger boats, housing a yacht club and diving club, private Ski boat fishing, the SA Navy, the Sea Recue Institute, several restaurants, take-always, hardware stores, outlets for the sale of fresh fish directly to the public, etc. In addition, a dry dock, cold storage facility for fruit, several fishing companies and a fishing training centre are also located in the Port (Per com. Ferreira and Van Niekerk). The harbour is currently operating at an average of 90% capacity, with seasonal variance (per comm. Dana, Adamson and Sultan).

The aim of this assignment is to prepare a baseline socio-economic assessment related to two mariculture sites earmarked for the development of a finfish farm. The sites were identified through an Environmental Strategic Review (Anchor Environmental, 2011) that included an assessment of various sites around the South African coastline.

Prof Jonathan Bloom of Umcebis Business Advisers was commissioned as an independent consultant to prepare a Baseline Socio-economic Assessment for the sites considered for the establishment of mariculture through aquaculture development zones in Algoa Bay. Prof Bloom (PhD) is a professor of real estate at Stellenbosch University. He has conducted more than 60 socio-economic impact assessments as an independent consultant for developments throughout South and Southern Africa over the past 15 years. Jonathan has research skills in design and implementation of research projects from both a qualitative and quantitative perspective. He majored in statistics and business economics and his background in statistical modelling of economic aspects related to projects and cost-benefit assessments have been used to assist clients with the assessment of socio-economic impacts associated with projects (refer to Appendix B for a declaration that confirms the independence of the person responsible for the preparation of the report).

1.2 Objectives

The objectives of the Baseline Socio-Economic Assessment are as follows:

- A description and understanding of the nature and scope of the proposed project, the location, conceptual scale, layout, etc;
- Assess the economic development patterns in the area envisaged for the proposed project with specific reference to the fish industry;
- Consider the economic viability and financial feasibility of the project and requirement for infrastructure enhancements;



- A socio-demographic and -economic profile of the population with specific reference to the fishing industry in the Port Elizabeth area;
- Identify possible social and economic impacts / consequences / implications associated with the proposed development of the fish farms.

1.3 Approach

Our approach for assessing the socio-economic baseline and eventual impacts of the facility is presented in Figure 1. The illustration shows that an assessment of the financial feasibility and long-term viability of a venture is an essential point of departure as long-term positive economic impacts can only flow from a project that is financially sustainable or viable. It must also fit and demonstrate compatibility with current policy and guidelines that address the development of marine aquaculture. These requirements are a critical aspect of economic desirability, which ensures that the proposed venture compliments economic development and planning as reflected in existing policy and development guidelines for mariculture.

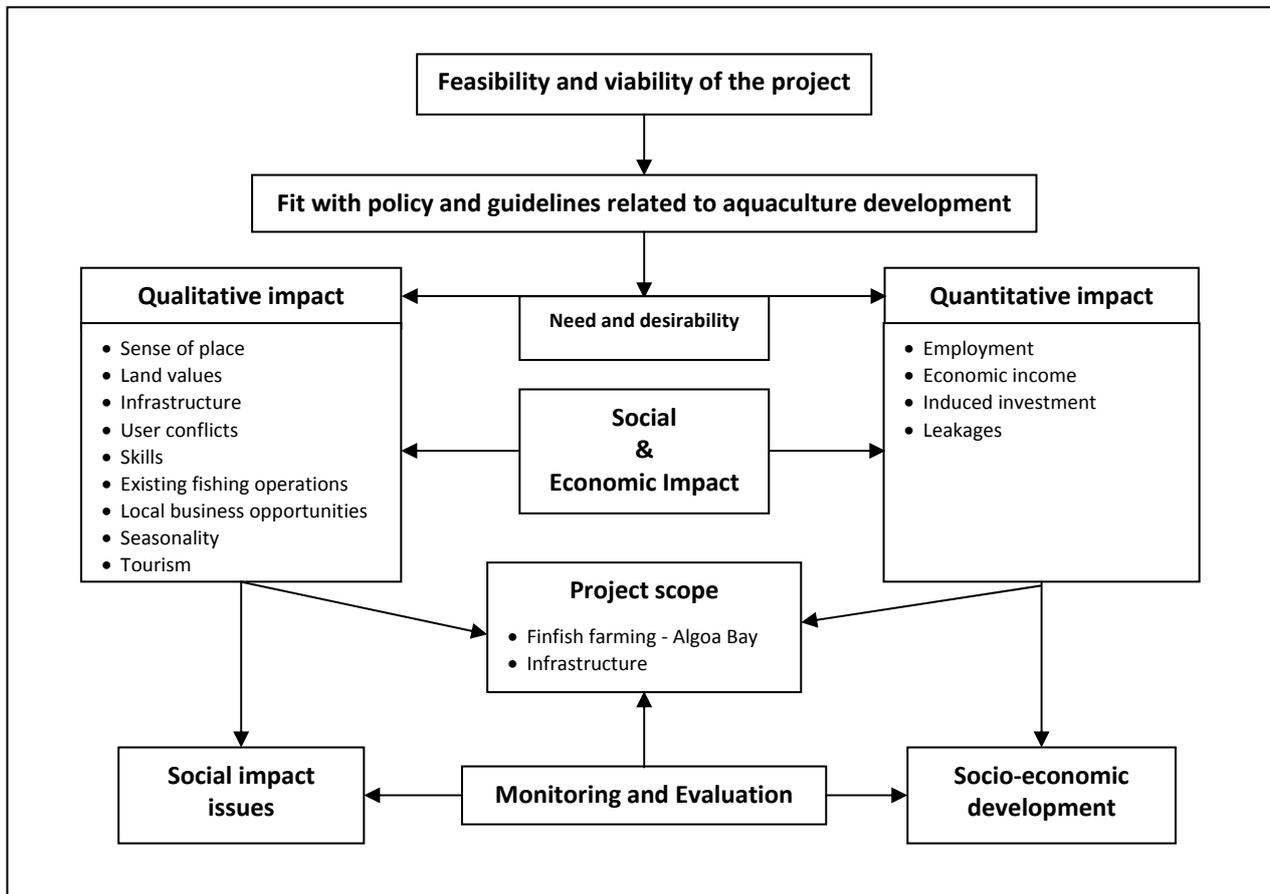


Figure 1: An illustration of the methodology used to provide specialist socio-economic input for the Environmental Impact Assessment process

Source: Multi-Purpose Business Solutions

The proposed project would have both qualitative and quantitative impacts (benefits and costs) on the socio-economic fabric of the area and specifically the communities in close proximity to the site. We would consider the quantitative economic impact, i.e. positive and negative consequences, for the core project and would analyse the socio-economic impact if required in the Impact Assessment phase of the Environmental Impact Assessment



(EIA) process. The Impact Assessment phase would also consider a qualitative assessment of both benefits and costs, where applicable, from a social perspective. In order to monitor and evaluate issues of a social and economic nature, a framework would be required that should be implemented to ensure that the communities and people residing in the immediate area of the project also benefit from it.

A total of 21 stakeholders that are directly affected by the development of Aquaculture Development Zones in Algoa Bay were interviewed through face-to-face discussions or via a telephone interview (see Appendix A for a list of persons consulted during the primary research phase).

Secondary data sources, which included legislation, frame reports, guidelines and publications, were consulted to inform the findings of the independent Baseline Socio-Economic Assessment and complement the primary research.

1.4 Selection and location of preferred ADZs and specification of the study area

The Department of Agriculture, Forestry and Fisheries (DAFF) expressed the intention to develop two potential marine aquaculture development zones (ADZs) specific for finfish cage farming in Algoa Bay off the Eastern Cape Province coast. The site designation and the shape were determined by various factors, which included identifying all criteria that are unsuitable (exclusionary & precautionary criteria) and suitable (inclusionary) for ADZs (Anchor Environmental, 2011). From a socio-economic perspective, the following primary and secondary criteria were considered although other criteria were also considered for the assessment of the sites:

Primary criteria:

- Suitability of the port;
- Distance from a suitable port;
- Other port logistics (off-loading facilities, cold storage, icemaker, processing facilities, fuel etc.)
- Water depth (related to acceptable level of infrastructure)

Secondary criteria:

- Existing fishing areas
- Marine eco-tourism
- Shipping lanes
- Mining and Military zones

Preferred ADZ

Based on the relative cost values, the Strategic Environmental Assessment prepared by Anchor Environmental (2011) recommends that two potential sites within Algoa Bay, referred to as Port Elizabeth/Coega 2 and Port Elizabeth/Coega 3, are considered appropriate but should be subjected to a detailed EIA assessment. Figure 2 provides an indication of the location of the Port Elizabeth/Coega 2 and Port Elizabeth/Coega 3 sites of 279 ha and 542 ha, respectively (Anchor Environmental 2011, p. 59). Access to the ADZs is from the Port Elizabeth or Coega harbours; the respective ADZs are located 6,5 km and 12 km from the Port Elizabeth port and 6,3 km and 7,5 km from the Coega port.

Alternative ADZ

The proposed alternatives suggested in the Strategic Environmental Assessment (Anchor Environmental, 2011) are referred to as (Port Elizabeth 1) in Algoa Bay and a site to the east of Cape St Francis (St Francis 1 - actually off Jeffrey's Bay).



Figure 2: The location of the proposed ADZ for marine aquaculture development denoted as Port Elizabeth/Coega 2 and Port Elizabeth/Coega 3

Source: Anchor Environmental (2011)

The study area for the Baseline Socio-Economic Assessment is determined by the specification of concentric zones that are referenced as all sub-places (communities) within 20 km and 40 km from the sites proposed for mariculture farms. Also, refer to the socio-demographic and -economic analysis in Section 5 for a detailed description of the communities.

Figure 3 provides an overview of the relative location of the Preferred and Alternative ADZs in the context of the Nelson Mandela Bay Metropolitan Area and Algoa Bay.

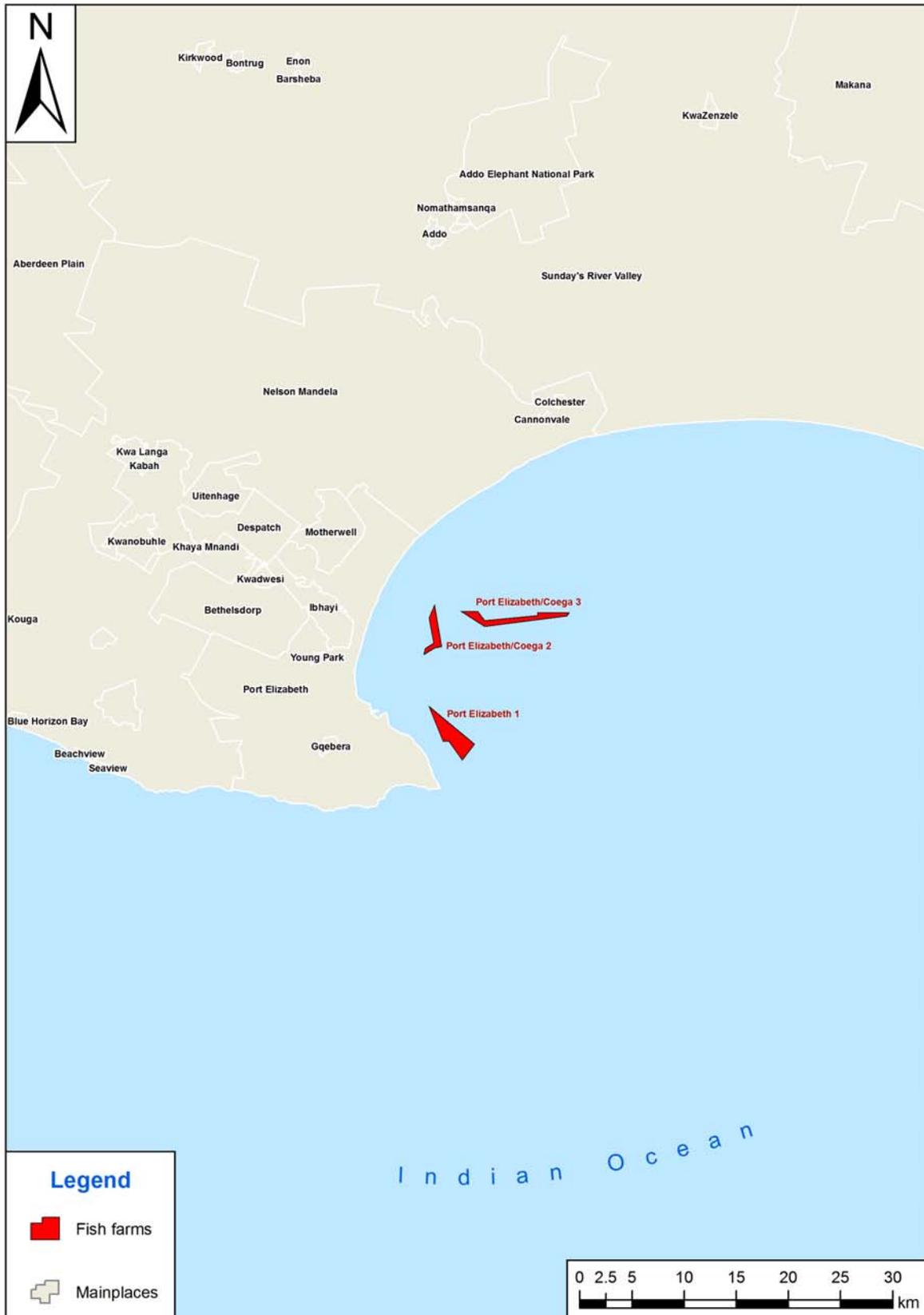


Figure 3: The location of proposed ADZs in the context of the Nelson Mandela Bay Metropolitan Area
Source: Prepared from GIS data (Statistics South Africa, 2003)



1.5 Marine aquaculture activities in Algoa Bay

A number of aquaculture activities are/were prevalent in Algoa Bay and at the Port Elizabeth harbour, with the following ongoing aquaculture activities confirmed (Per comm. Dana, Sultan and Nel):

- A private fish breeding station on the harbour, producing only fish for bait purposes.
- A small oyster breeding station about 2 km from the harbour in the direction of Coega, maintained by NMMU for research purposes.

Aquaculture projects that were operational in the past include fish-breeding projects – the reasons for their demise are unknown to participants in the primary discussions. One of these was managed by NMMU and the other by Irvin & Johnson Ltd (I&J); an on-land fish-breeding project was suppose to be a black empowerment project, but the project had no positive outcome (per comm. Viljoen, Scholtz and Allen).

The Department of Science and Technology - in partnership with Irvin & Johnson Ltd (I&J) - is conducting a 2-year pilot project to ascertain the commercial, technical and environmental viability of sea-based cages for breeding three indigenous and endangered South African line-fish species, namely dusky kob (*Argyrosomus japonicus*), silver kob (*Argyrosomus inodorus*) and yellowtail (*Seriola lalandi*) to 1 kg, to be sold through an uptake agreement with I&J. A total of four HDPE cages are deployed on a site in the Nelson Mandela Bay harbour, sheltered from the wind and one kilometre into the ocean. In December 2007, 40 000 dusky kob fingerlings with an average mass of 8 g were added to one of the cages. The successful introduction of kob was followed in January 2008 by the introduction of 18 000 yellowtail fingerlings (average weight of 5 g), in sea cage #2. Both cages are equipped with locally produced predator nets together with an inside net; all nets are weighted to maintain the cage structure of the nets in the water. The fish are fed twice daily (weather permitting) and they appear to be performing above expectations. Fish sampling after the third production month indicated an average weight of 74.73 g for kob and 17.57 g for yellowtail, compared to the respective target weight of 53.32 g and 15 g (Department of Science and Technology, 2011a). The intention is that insight gained from this pilot project would assist with the development of a commercialisation model that would benefit the public and offer some BEE opportunities.

1.6 Social context of the fish industry in Algoa Bay

As stated previously, finfish is not a large industry in Algoa Bay. Our primary research among stakeholders in the fishing industry suggests that the average age of fishermen range from 20 to around 50 years of age, with the median around 35 years; education levels range from Grade 8 to Grade 12 and a monthly income of R4 500 to R6 000 depending on the season. Due to the seasonality of the fishing industry, several fishermen have other occupations, but take leave in chokka season (per comm. Allen, Giers, Nel and Rabe). The fishermen are 99% local people that reside in their own homes, but they stay on the boats during fishing trips, as they are not allowed to disembark or take leave (per comm. Allen, Giers, Nel and Rabe).

There is no social conflict between the fishermen and the community, as they are perceived to be local people and not incomers stealing jobs from local residents. Key day-to-day challenges associated with community life are linked to social ills linked to alcohol abuse, living in poor communities and in less than favourable living conditions.

1.7 Marine aquaculture and the traditional fishing industry

Over the long term, fish breeders should place some of the fish back into the ocean to create a level of sustainability (per comm. Nel). Fish from fish breeding farms should be placed back in the ocean using the principle of ranching. The fish will then mature in their natural environment to lay eggs and breed normally. It was also noted that it is cheaper to produce fish in the breeding cages than catching fish (per comm. Nel and Rabe). The development of marine aquaculture could therefore provide cheaper protein products on the market, but needs to be properly regulated.



An increase in exports could provide more protein to address problems of undernourishment and affordability. However, the local market should receive preference due to the existing under-supply of protein. At present, large supermarkets buy fresh fish directly from the fishing companies, but sell it at double the price. Consequently, fish available in the retail trade is too expensive for the average consumer (per comm. Nel and Rabe).

1.8 Limitations of the study

Several limitations were identified during the study:

- Detailed socio-demographic and –economic statistics for Nelson Mandela Bay are outdated;
- Comparisons are seldom possible between the 1996 and 2001 census years due to changes in the enumeration areas;
- There are discrepancies in the 2001 population data for the area (these were corrected where possible);
- A comparison between the population figures for 2001 (Census) and 2007 (Community Survey) is not possible due to the limitations of selecting a sample that is extrapolated to the population as was done for the Community Survey (2007). A significantly larger margin of error would be prevalent when adopting a sample approach vs. a census (which is intended to cover the entire population and not a selected sample); and
- It was not possible to access official statistics such as tonnage from the Harbour Master as the statistics are reserved for official government use.

1.9 Structure of the report

The report includes the following sections:

1. An introduction to the study, a description of the study area and the proposed project, and an outline of the approach to the study;
2. Perspective of the Nelson Mandela Bay economy with specific emphasis on the fishing sector together with a qualitative assessment of the employment, value added, output and competitiveness;
3. A comment on the economic viability and financial feasibility of the project and an assessment of the fit (compatibility) of the proposed development of ADZs within the ambit of existing legislation, regulatory environment and guidelines issued by the government departments;
4. Socio-economic and -demographic profile of the population likely to be affected by the establishment of ADZs using concentric zones of 20 km and 40 km from the proposed sites for ADZs;
5. Initial outcomes of the socio-economic baseline assessment; and
6. Identification of potential impacts.



2. ECONOMIC OVERVIEW OF THE FISHING INDUSTRY IN THE PORT ELIZABETH AREA

2.1 Analysis of the local economy with emphasis on the fishing sector

It is not possible to distinguish the contribution of the fishing industry to the Agriculture, Forestry and Fishing sector in the Port Elizabeth area. However, the Eastern Cape Development Corporation (ECDC) estimates that the fishing industry in the Eastern Cape generates over R400-million a year in revenues. Cuttlefish and squid form the largest part of the fisheries exports (R300 million) followed by sardines (R26 million, fish and abalone. Export markets for aquaculture and fisheries from the Eastern Cape include Italy, Spain, Malaysia, Taiwan and Hong Kong (Eastern Cape Development Corporation, 2009).

Of the R535 million worth of animal and animal products exported from the Eastern Cape each year, R411 million of this is related directly to fisheries and aquaculture - this equates to 78% of the total animal and animal product exports from the province.

The Eastern Cape Socio-Economic Consultative Council (ECSECC, 2011) estimates that the gross output (which equates to revenue) of the Agriculture Forestry and Fishing sector for the Eastern Cape Province was R6,5 billion in 2009; the comparative figure for the Nelson Mandela Bay Municipal area is R522,0 million. If the ECDC estimate of the fishing industry (see above) is correct, the fishing industry in terms of gross output contributes 6,16% to the gross output of the Agriculture, Forestry and Fishing sector of the Eastern Cape Province economy.

The fishing industry in the Eastern Cape employs approximately 3 500 people in both primary and secondary production. The majority of the fishing infrastructure is concentrated in the Port Elizabeth Harbour where cold-storage and export facilities exist (Eastern Cape Development Corporation, 2009). If the proportion of Agriculture, Forestry and Fishing output for the Nelson Mandela Metro to that of the Eastern Cape Province is used to determine the proportional contribution of fishing in the Nelson Mandela Bay Municipality to the Province, it appears that R32,2 million could be attributed to fishing in the Nelson Mandela Bay Municipal area.

Both the Coega and East London IDZ's have established themselves as aquaculture industrial and manufacturing hubs with investments in this industry totalling over R75 million. Aquaculture investments in the province over the past four years have included:

- A prawn-farming venture in the Coega IDZ;
- A kob hatchery in the East London IDZ;
- The expansion of a successful abalone farm on the Eastern Cape east coast;
- A marine caged finfish project in the Nelson Mandela Bay; and
- An in-land kob farming operation 30 km outside East London.

Case Study: Espadon Marine, a marine finfish operation

Espadon Marine is a marine finfish operation located at the East London IDZ with its first commercial harvest of kob expected soon. The current financial year (2011) has seen Espadon expanding into a second site in the zone and a further R50 million will be invested in the next two years. The kob harvest planned for the market will be the first from a commercial marine finfish operation in South Africa as all previous harvests have come from experimental-scale operation. Construction of a dedicated seawater pipeline has commenced in the East London IDZ that will be able to supply a regular supply of seawater (Eastern Cape Development Corporation (2011).

2.2 Qualitative performance assessment of Port Elizabeth Metro economy

A qualitative assessment of the economic sectors of the Port Elizabeth Metro economy is presented in Figures 4 and 5. The aim of this assessment is to consider the existing profile of these sectors in the Port Elizabeth Metro economy in terms of key indicators such as employment, competitiveness, production output and gross value added. The most important contributors to the economy of the Port Elizabeth Metro area, which are also aligned with a high value added and high employment focus are tourism, manufacturing and financial and business services. It is also important to note the interdependence between the sectors in support of the developing a sub-industry such as marine finfish farming.

Figure 4 indicates the importance of Manufacturing and Construction as an economic activity that provides high value-addition and employment. Notwithstanding, high leakage factors are prevalent in economies with narrow economic bases such as Port Elizabeth Metro and therefore income leakage will erode to a certain extent the indirect and induced value added to the Port Elizabeth Metro economy by the establishment of a marine finfish farm in Algoa Bay.

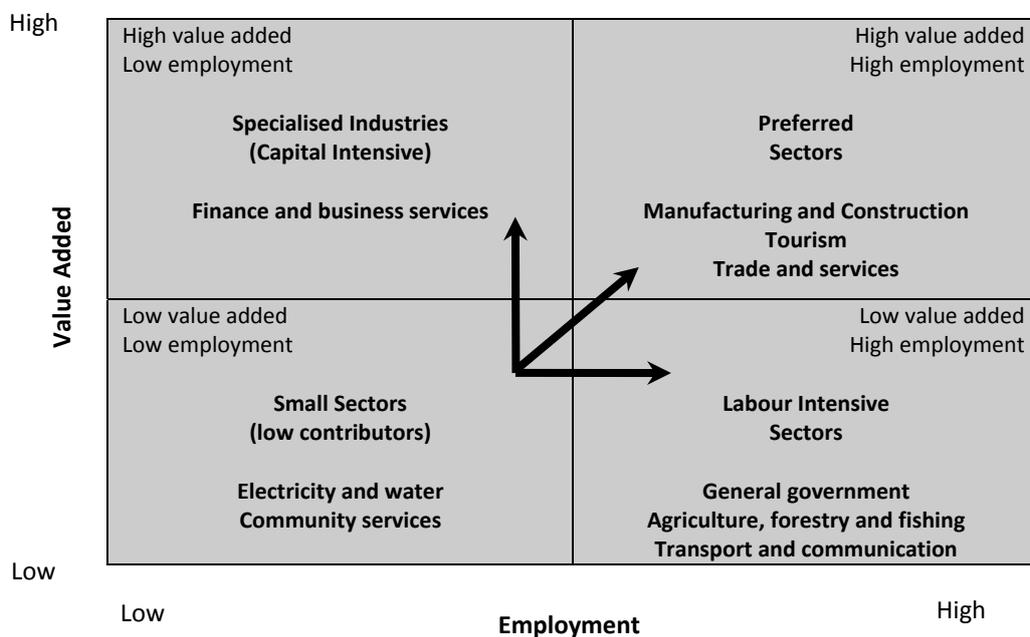


Figure 4: Economic sector performance profile of the Port Elizabeth Metro economy for value added relative to employment.

Source: Multi-Purpose Business Solutions

The emphasis of the Port Elizabeth Metro economy on manufacturing, finance and business services, as well as trade and services, is aligned with the need to focus on economic activities that provides high value-addition and employment opportunities in the area. The basis provided by Agriculture, Forestry and Fishing alludes to a labour intensive focus, which could contribute to the alleviation of unemployment in the area. Especially the development of marine finfish farms in Algoa Bay will also contribute to employment in the sector due to the labour intensive nature of the activity.

The direction of economic development and focus on preferred sectors of the Port Elizabeth Metro economy is provided by the direction of the arrows in Figure 4. The positioning of each sector indicates the industry or cluster contribution to the economy of Port Elizabeth Metro in terms of value added and employment and indicates which sectors need to be “shifted” in the direction of the arrows in order to achieve a higher status in terms of either employment or value-added, or both. The assessment also alludes to the need to consider adding value to

the fish product harvested from the finfish farm to strengthen the manufacturing sector and retain the value added to the product in the Port Elizabeth Metro economy.

Figure 5 considers the competitiveness of sectors in the Port Elizabeth Metro economy to the production output of the specified sector. The positioning of each sector indicates the industry or cluster in terms of competitiveness and output in the Port Elizabeth Metro economy and indicates which sectors need to be “shifted” in the direction of the arrows in order to achieve a higher status in terms of either competitiveness or output, or both.

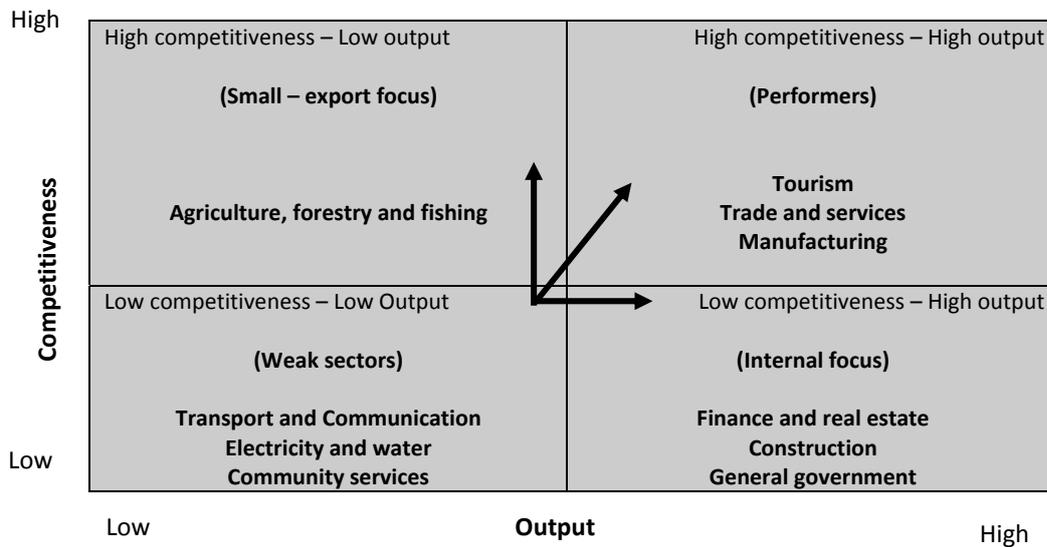


Figure 5: Economic sector performance profile of the Port Elizabeth Metro economy for competitiveness relative to production output.

Source: Multi-Purpose Business Solutions

The aim of this assessment is to develop the sectors of the Port Elizabeth Metro economy that could be considered as performers as highlighted in Figure 5. Our analysis suggests that Transport and Communication, Manufacturing, Electricity and Water, and Community Services currently offer the Port Elizabeth Metro area very little in terms of output and competitiveness and are considered weak sectors. The performing sectors of the Port Elizabeth Metro economy in terms of high output and high competitiveness include the tertiary sector activities of Tourism and Trade and Services and secondary sector Manufacturing activity.

Our qualitative assessment provided above suggests that the Manufacturing, Construction, Tourism, and Trade and Service sectors are **preferred**, while Tourism, Trade and Services are **performing** sectors. Both the **preferred** and **performing** sectors contribute to the current strength of the Port Elizabeth Metro economy and provide a basis for future economic growth and development in other sectors not yet considered in the context of a **preferred** or **performing** industry sector through the strengthening of inter-sectoral linkages. The linkage between Agriculture, Forestry and Fishing in the primary sector of the economy and Manufacturing (secondary sector) is emphasised as a strong opportunity to forged backward linkages and consequently enhance the output of both sectors.

This implies that Preferred and Performing sectors to greater or lesser extent benefit from the proposed development of marine finfish farming in Algoa Bay, especially during the operational phase where the need for sustainability is a key factor to unlock the economic value. Sectors that will receive particular benefit from the development of the marine finfish farm include Trade and Services, Transport, chemicals and chemical products and other industries of the agriculture sector. During the operational phase, various service industries will also be supported by the proposed fish farm venture



2.3 Scope of the fishing industry in Port Elizabeth

Two major fishing companies catch line fish and two smaller ones operate in the Port. Eyethu Fishing (Pty) Ltd is the largest fishing company dealing with finfish in the harbour. Their infrastructure consists of eight boats with trawler nets to catch the fish, namely floor fish like hake, sardine and horse mackerel, as well as a small amount of squid. On average, 5 000 tons of hake, 4 000 tons of sardine, 3 000 tons of horse mackerel and about 800 tons of squid are caught annually. Eyethu has sufficient cold storage facilities to store up to 500 tons of fish per month. There are no other cold storage facilities available in the harbour except the Port Elizabeth Cold Storage (Pty) Ltd that only caters for fruit exports

According to the owner, Mr Nel, there are more than enough fish in the Algoa Bay area and along the coastline of South Africa to provide in the demand for fish products. A major problem South Africa is facing, is foreign trespassers (like the Chinese) that are poaching South African fishing resources. The South African Government is not doing anything to avoid it, which makes it difficult for local people to catch enough fish to meet the local demand.

Another fishing company, Talhado Fishing, is considered as the second largest fishing company dealing with finfish in the harbour. They focus on three main types of fish, i.e. sardines, mackerel and hake, which are caught with a seine net. According to the owner, Mr Rabe, they catch around 1 000 tons of sardines, 2 500 tons of hake and 1 500 tons of mackerel per annum. A small number of the fish are sold directly to the public, whilst the rest are used for bait and protein.

Itemba Labantu Fishing is small on line fish business and concentrates more on squid (per comm. Steyl).

2.3.1 Tonnage of fish caught in the Algoa Bay area

It is difficult to obtain any statistics on finfish or other marine products being caught in Algoa Bay. The manager of the NRCS indicates that the finfish industry in Algoa Bay is small in comparison to other areas like Cape Town, and will not impact significantly on the national fishing industry if the catches in the Algoa Bay area are limited (per comm. M Young). Our discussions with the owners of Eyethu and Talhado indicate that they contribute up to 80% of the total tonnage of finfish caught in the area (per comm. Nel and Rabe). Based on their figures, it is possible to deduce the total tonnage of key types of finfish caught in the area. The findings are indicated in Table 1.

Table 1: Estimated total tonnage of finfish caught in 2011

Type of fish	Eyethu	Talhado	Total (80%)	Total tons
Hake	5 000	2 600	7 600	9 500
Sardines	4 000	1 300	5 300	6 625
Mackerel	3 000	1 600	4 600	5 750
Total	12 000	5 500	17 500	21 875

Source: Eyethu and Talhado (as adapted)

2.3.2 Trends and challenges facing the local fishing industry

There are 243 registered fishing boats in the harbour (per comm. Dana and Adamson). There are on average five fishermen per boat, giving a total of just over 1 200 fisherman working on the boats. No specific trends are emerging in the fishing industry, except for the quota system that had a negative impact on local small fishing concerns. Government needs to revise the quota system and the principle of managing fish catches for individual fishermen through co-operatives (per comm. Kotze and Moodley).



Foreign nations catching fish in South African territorial waters contribute generally to the limited catches of fish by South African fishing companies. In the Algoa Bay area, there is sufficient fish to create a viable business for most of the businesses operating in the Algoa Bay area. Marine and Coastal Management monitors the size of the fish caught, the condition of the boats, nets, and other equipment of all fishing boats and fishing companies on a regular basis (per comm. Nel, Rabe and Kotze). This is perceived to be a positive measure and ensures a well-regulated environment. The quota system, which is regulated by the “Commercial Fishing Right Allocation in Postapartheid South Africa: Reconciling Equity and Stability”, is considered problematic and appears to only benefit a small number of fishermen (Kleinschmidt et al., 2010). In addition, quotas also affect the sustainability of the income that fishermen receive (per comm. Allen, Giers, Nel and Rabe).

Our discussions with role players in the fishing industry in Algoa Bay suggest that fish farms should have no negative impact on the current fishing industry. On the contrary, commercial fish farms may offer some level of sustainability for local residents given the associated employment opportunities that are created.

2.4 Nature and scope of the aquaculture industry with specific reference to marine aquaculture

2.4.1 A national perspective

The aquaculture industry entails the farming of aquatic i.e. freshwater and marine organisms such as fish, molluscs, crustaceans and plants under controlled conditions, which include interventions such as regular stocking and feeding during the rearing process to increase production. Marine aquaculture is one of the fastest growing food production systems in the world. Over the past 15-20 years, aquaculture has developed into a global industry, with over 100 countries engaging in the production of more than 250 different species of finfish, shellfish, crustaceans and aquatic plants.

According to the Food and Agriculture Organisation (FOA), global production of capture fisheries and aquaculture supplied the world with about 142 million tonnes of fish in 2008, China remains by far the largest fish-producing country, with the production of 47.5 million tonnes in 2008 (32.7 and 14.8 million tonnes from aquaculture and capture fisheries, respectively). Africa accounts for less than 2% of the global aquaculture production (United Nations, 2010).

In terms of global production, 74,6 million tons were produced in 2008 (excluding China) of which 67,0 tons are attributed to capture and 7,6 tons to aquaculture - or 10,8% of total marine production. Estimates by the FOA indicated a 6,58% growth in marine aquaculture in 2009 (United Nations, 2010).

In 2008, South Africa farmed only 5 000 tonnes of aquatic products (18 00 tonnes of aquatic plants, 2 000 tonnes of shellfish and 1 200 tonnes of fresh fish products) representing 0.1% and 0.01% of Africa's and world aquaculture production, respectively. Over a third of SA's reported production is seaweeds, while the remainder comprises trout, abalone, molluscs, oysters, tilapia and catfish (Department of Environmental Affairs and Tourism (2010). The South African marine aquaculture sub-sector is relatively small, but the growth potential over the next few years is very promising as a result of the levelling off of worldwide fishery production and an expected rise in demand and therefore the price for high-value fishery products (Cacadu District Municipality (2011).

Finfish cage culture and/or long-line operations in sub-tidal waters using net-cage systems anchored to the seabed, ropes, trays or rafts include species such as kob, yellowtail, tuna, salmon, trout, mussels, oysters, scallops. The infancy of finfish cage culture in South Africa is demonstrated by the establishment of only two experimental farms to date. Although South Africa has not commercially produced any marine finfish, mariculture is a fast developing and growing sector with a focus on mussels, oysters, abalone, seaweeds and prawns. There are little finfish culture operations due to technology challenges and the current supply of finfish by capture fisheries. Three indigenous and endangered South African linefish species, namely dusky kob (*Argyrosomus japonicus*), silver kob (*A. inodorus*) and yellowtail (*Seriola lalandi*) are good candidates for cage aquaculture as they are widely distributed, highly productive, tolerate a wide range of temperatures and share a excellent domestic and



international market profile (Department of Science and Technology, 2011b). Also, refer to section 1.6.2 for an account of a current finfish cage culture pilot project in Algoa Bay.

Overall, the South African aquaculture sector remains relatively small, but (as in many countries) is largely based on introduced exotic species, which comprised 61% of total fish and shellfish production in 2008. South Africa accounts for slightly less than 27% of the African marine aquaculture production (Department of Environmental Affairs and Tourism, 2006a). These outcomes highlight their importance for current and future aquaculture development in South Africa (Department of Environmental Affairs and Tourism (2010).

Figure 6 indicates the production in South Africa of fish and shellfish with specific reference to marine aquaculture in 2000 and 2008.

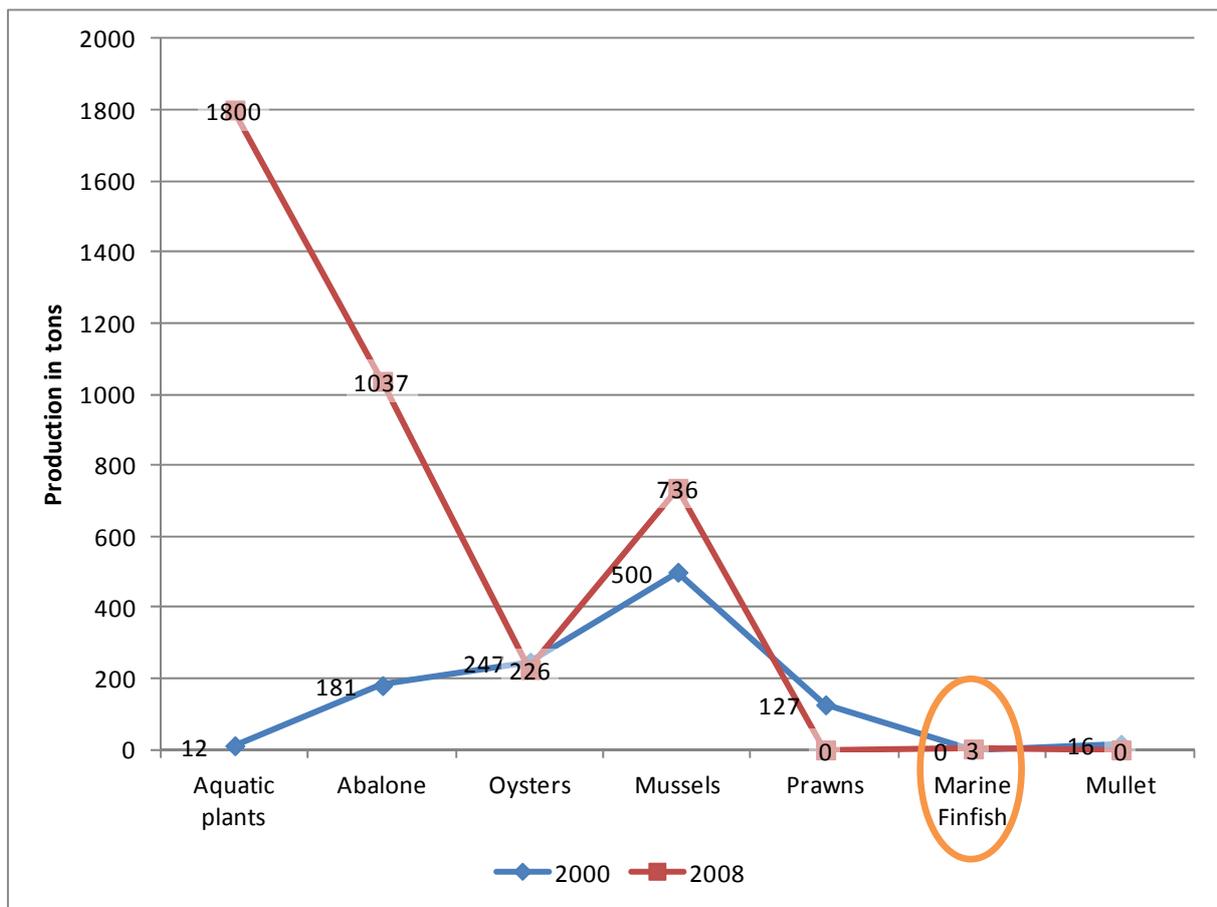


Figure 6: An illustration of the production of marine aquaculture products with a comparison between 2000 and 2008
Source: Adapted from National Aquaculture Strategic Framework (date unknown)

The findings illustrated in Figure 6 suggest that the largest increase in production over the period was recorded for aquatic plants, abalone and a slight increase in mussel production. A reduction in production of Oysters and Mullet occurred. In terms of finfish production, only 3 tons was recorded in 2003, which is attributed to production by pilot plants and not commercial production. The National Aquaculture Strategic Framework (2010) indicates that, despite almost two decades of Research and Development (R&D) and predictions (Shipton and Britz, 2007) no notable marine finfish production was reported, neither has the commercial viability of an operation that requires a high capital investment, been demonstrated.

2.4.2 Eastern Cape

The Eastern Cape Province actively participates in aquaculture production and is considered the second largest producer of marine aquaculture product in South Africa. Table 2 indicates the production of marine aquaculture in the coastal provinces in 2008.

Table 2: A comparison of marine aquaculture production across the coastal provinces in 2008

Aquaculture	Eastern Cape	KwaZulu-Natal	Northern Cape	Western Cape
Marine (tons)	668.4	2.5	56.7	1715.5
Percentage contribution	27.36%	0.10%	2.32%	70.22%

Source: Britz et al., 2009

The findings presented in Table 2 indicates the Eastern Cape produced 27,36% or 668,4 tons of marine aquaculture-related fish and shellfish compared to Western Cape that captures slightly more than 70% of the marine aquaculture production. The Northern Cape and Kwazulu-Natal are small producers and command slightly more than 3% of total marine aquaculture production. The most common marine aquaculture species are oysters, abalone, mussels and saltwater fish.

Table 3 indicates the value of aquaculture production for the coastal provinces in 2008, together with the percentage contribution of each province to the total value.

Table 3: The value of aquaculture production for the four coastal provinces in 2008

Aquaculture	Eastern Cape	KwaZulu-Natal	Northern Cape	Western Cape
Marine (R'million)	24.5	0.1	4.4	256.8
Percentage contribution	8.57%	0.03%	1.54%	89.85%

Source: Britz et al., 2009

Table 3 indicates that the Eastern Cape commands 8,57% of the total value of aquaculture production. The Western Cape represents 89,85%, while the remaining coastal provinces have a market share (in terms of value) of slightly less than 2%. It also appears from the analysis that higher prices are obtained for aquaculture production in the Western Cape than in the Eastern Cape.

2.5 Need for production of finfish mariculture

Aquaculture is the fastest growing form of food production in the world and a significant source of protein for people in many countries. Globally, nearly half the fish consumed by humans is produced by fish farms. This worldwide trend toward aquaculture production is expected to continue. At the same time, the demand for safe, healthy seafood is also expected to grow (California Green Solutions, 2011).

Over the past decade, the surging demand for fish and fishery products has mainly been met by aquaculture production, as capture fisheries have been rather stagnant or even declining in some countries (United Nations, 2010, p. 67). Notwithstanding the growth in the consumption of fish and food in general and the positive long-term trends in nutritional standards, under-nutrition (including inadequate levels of consumption of protein-rich food of animal origin) remains a huge and persistent problem (p. 68).



The long-term forecast for the demand for food remains positive, driven by population growth and urbanization. In particular, **demand for fish products is expected to continue to rise in the coming decades**. However, future increases in per capita fish consumption will depend on the availability of fishery products. Major increases in fish food production are forecasted to come from aquaculture, while production from capture fisheries stagnates. Taking into account the population forecasts, an additional 27 million tonnes of production will be needed in 2030 to maintain the present level of per capita consumption (United Nations, 2010).

Future demand will, however, be determined by a complex interaction of several factors and elements. The global food sectors, including the fishery sector, will have to face several challenges stemming from demographic, dietary, climatic and economic changes, including reduced reliance on fossil energy and increasing constraints on other natural resources.

As the world's population continues to grow, lack of fresh water and space means that terrestrial agriculture is unlikely to be able to meet food demand. Freshwater aquaculture, which is largely confined to the tropics, is expanding, but its reliance on fresh water may limit long-term growth. Fishing catches have been declining globally for two decades, and although conservation measures and a shift in consumption patterns could allow some recovery, marine aquaculture holds more potential for sustained growth. Aquaculture (which includes mariculture) is best positioned to contribute to food security, wealth and job creation. It also contributes to the reduction of protein deficiency in the diets of many rural communities (Science Daily, December 2009).

A report from the Department of Science and Technology suggests that in many parts of Africa, aquaculture offers strategic entry points for short and long-term investment opportunities to contribute to food security, improve health, women's economic empowerment and local enterprise development for the poor. In South Africa, aquaculture is providing an opportunity for the socio-economic development and beneficiation by rural communities through the sustainable non-consumptive utilisation of water in State and privately-owned irrigation water-works and storage reservoirs and schemes, without the transfer of land ownership being a prerequisite (Department of Science and Technology, 2011a).

It is clear from emerging trends worldwide, which are also applicable to South Africa, that aquaculture (including marine finfish culture) could positively contribute to addressing the following:

- Increasing demand for fish products in the coming decades;
- Major increases in fish food production are forecasted to come from aquaculture;
- Continued growth in the world population;
- Lack of fresh water and space;
- Marine aquaculture holds more potential for sustained growth due to declining fishing catches; and
- Aquaculture (which includes mariculture) is best positioned to contribute to food security, wealth and job creation.



3. LEGISLATIVE AND REGULATORY CONTEXT

The individual benefits of a project overstate the true benefits if the project diminishes benefits elsewhere in the area. The economic desirability is therefore essential to determine whether the proposed development compliments economic planning as reflected in spatial development planning. It is not sufficient that the development results in some positive spin-offs if it is not compatible with planning guidance designed to maximize the *overall* economic potential of an area. Regulatory Policy and Guidelines in particular are central to economic development planning and are prepared in order to guide overall development of an industry or a sub-industry in a direction that local and provincial authorities see as desirable. In order to provide some context, the Nelson Mandela Bay IDP and various related strategic frameworks, policies, guidelines and sector development plans are considered as a premise for further assessment.

3.1 IDP of Nelson Mandela Bay (NMB) Municipality (2010)

The Nelson Mandela Bay Metropolitan Municipality IDP (2010) indicates that the development of a mariculture industry in Algoa Bay has the ability to stimulate economic development and create jobs at the local level. The mariculture industry is labour intensive and the pilot marine finfish project in Algoa Bay has generated interest from the local aquaculture industry. The project aims at creating employment and human capital development opportunities. The resultant BEE opportunities will also create additional wealth and job opportunities. In terms thereof, the Key developmental challenges for the Nelson Mandela Metropolitan Municipality as stated in the IDP, is to supports the potential outcomes of the venture to reduce poverty and unemployment

The primary goal of the NMB Municipality over the next three years is to ensure that the jobless growth trend is reversed and that more emphasis is placed on job creation and youth development. Skills development that is linked to labour demand by industries will be prioritised, which would include training of artisans to provide competent skills in support of the manufacturing and maritime industries. The Economic Development Strategy of the NMB Metro identifies skills development and infrastructure development as key economic enablers for the Nelson Mandela Bay (NMB) Municipal area. T he focus must be placed on industries that yield more job creation opportunities and economic diversification of the NMB Metropolitan economy to generate the anticipated jobs.

The IDP also emphasises that the key to industrial growth and innovation in NMB include the following programmes:

- Infrastructure and logistics;
- Skills development;
- Investment facilitation;
- Industrial finance and incentives; and
- Small business support

Table 4 indicates the link between the programmes envisaged in the IDP and the benefit from the programme that could be achieved from the development of a marine mariculture sub-industry.

Table 4: Linkages between the envisaged IDP programmes and potential benefit from a mariculture programme

Infrastructure and logistics	Alignment with the mariculture Infrastructure and logistics
Skills development	The mariculture finfish operation could provide additional skills and up-skilling opportunities to persons that would either like to obtain employment in the future or persons that are already working in the fishing industry that could be up-skilled
Investment facilitation	An opportunity exists to invest in the finfish mariculture once the pilot operation has provided an indication of the viability and feasibility of a finfish farm in Algoa Bay.
Industrial finance and incentives	Given the importance of food security and the need for and envisaged growth in the aquaculture industry and the BEE opportunities, finance from the Agriculture SBU of the IDC and incentives from the DTI may be available to assist with the establishment of finfish mariculture ventures in Algoa Bay (also refer to the Strategic Environmental Assessment, 2011).
Small business support	Small businesses could position themselves to support the operations of a finfish mariculture operation, provide services and products required to establish and operate the fish farm, and also benefit from the downstream opportunities that are presented by the development of a sustainable finfish farm in Algoa Bay.

3.2 Strategic Environmental Assessment (2011)

The Strategic Environmental Assessment prepared by Anchor Environmental (2011) alludes to the purpose for the establishment of Aquaculture Development Zones specifically for marine finfish cage aquaculture, which is relatively new to South Africa. The assessment also intended to encourage investor and consumer confidence in the marine aquaculture industry in South Africa, and also to create incentives for industry development, provide marine aquaculture services, manage risk associated with aquaculture, and provide skills development and employment for coastal communities. Various sites were considered as part of the assessment and the outcome of the analysis indicated the following:

“At this time, the DAFF has communicated that it wishes to proceed with establishing ADZs in the Eastern Cape Province. Based on the relative cost values, we recommend that two potential sites within Algoa Bay (Port Elizabeth/Coega 2 & 3) are subject to detailed EIA assessment with a view to declaring ADZs, with a third site in Algoa Bay (Port Elizabeth 1) and a site to the east of Cape St Francis (St Francis 1 actually off Jeffreys Bay) be considered as alternatives”.

The Strategic Environmental Assessment (Anchor Environmental, 2011) differs from the earlier SEA (2009) in that it focuses on marine finfish cage farming only, whilst the earlier report also considered mariculture of shellfish and seaweed. The site selection methodology that is the focus of this SEA is based on the application of quantitative criteria that were developed in conjunction with key industry, academic and government stakeholders and applied using Geographical Information System software. The latter approach was adopted to address shortcomings in the site selection methodology used earlier (Department of Environmental Affairs and Tourism, 2009a).

The Strategic Environmental Assessment (2011) should also be read together with the Marine Aquaculture Policy (Republic of South Africa, 2007) that gave rise to a “Marine Aquaculture Policy Implementation Plan 2009-2014” (Department of Environmental Affairs and Tourism (2009b), wherein the need for the establishment of aquaculture development zones was identified as one of the 11 key required implementation programmes.



3.3 Draft National Aquaculture Strategic Framework (2010)

The Draft National Aquaculture Strategic Framework (Department of Environmental Affairs and Tourism, 2010) indicates that aquaculture development is a priority of government. The Government recognises the opportunities presented by aquaculture and is committed to creating appropriate platforms for access to and optimal utilisation of available resources and existing infrastructure to facilitate new economic activity to create opportunities for wealth creation and gainful employment whilst ensuring the government's key overriding constitutional obligation for a fairer and equitable society is upheld.

The vision for the South African aquaculture sector is to develop and grow a sustainable and competitive aquaculture sector that meaningfully contributes to transformation, wealth creation and employment through a diversity of production systems that produces safe, nutritious and affordable food while ensuring the environmental services required for securing its future. The mission is to maximise socio-economic opportunities and benefits from aquaculture through meaningful transformation and being a regional leader. The policy covers 16 strategic issues to create an ambient environment for aquaculture to flourish:

- Developmental focus
- Legislation and regulatory framework
- Financial Services & incentives
- Access to land and water
- Availability of and access to inputs
- Culture based fisheries
- Training, education and capacity building and research
- Technology transfer
- Extension and sector outreach services
- Aquatic animal health management
- Information systems
- Product quality, safety and diversification
- Gender, youth and disability
- Marketing and trade
- Monitoring, control and evaluation

It is essential that these issues are considered holistically and that all stakeholders that could provide input in the establishment of finfish mariculture operations be considered. The value chain for the development of the finfish mariculture is therefore an fundamental premise to understand the linkages and interactions between the requirements and role-players.

3.4 Draft Policy for the development of a sustainable aquaculture sector in South Africa (2006)

The Draft Policy for the development of a sustainable aquaculture sector in South Africa (Department of Environmental Affairs, 2006b) envisages the following objectives:

- To create an enabling environment that will increase the contribution of aquaculture to economic growth within the Accelerated and Shared Growth Initiative for SA (ASGISA) framework;
- To transform and encourage broader participation in the aquaculture sector;



- To develop regulatory and management mechanisms aimed at minimising adverse environmental impacts associated with aquaculture practices (e.g. sea ranching, sea-based cage farming etc.); and
- To increase the resource base of aquaculture from the few species being farmed currently to a more diverse suite of species.

In order to ensure implementation of the policy, a proposal was made to adopt the following guiding principles:

- **Creation of an enabling environment** - It is envisaged that attempts will be made to reduce entry transaction costs through streamlining of administrative processes such as permitting.
- **Transformation and broadening of participation:** It is proposed that a variety of tools will be used to encourage broader participation within the sector.
- **Control of environmental impacts:** Appropriate Environmental Quality Standards, guidelines, penalties, monitoring systems as well as appropriate technologies will be applied to regulate and manage the potential adverse impacts of possible pollution, among others.
- **Expanding of the resource base:** Research expertise will be harnessed in government, the private sector and academic institutions to provide information on new species and technologies. Guidelines will be developed for specific sector farming.

3.5 Strategic Environmental Assessment (2009)

The Strategic Environmental Assessment (2009) was prepared by the Department of Environmental Affairs and Tourism (2009a) to identify potential sea-based sites suitable for marine aquaculture development in South Africa. The assessment covered an assessment of opportunities for marine aquaculture related to shellfish and seaweed. The different site categories were identified as follows:

- Primary site: Ocean space and land-based infrastructure available
- Secondary site: Ocean space available, but land-based infrastructure inadequate. Typically, shortcomings relate to port depth and fish handling capacity.
- Single use site: The sea space available does not justify the expense of going through a zoning exercise, but space and infrastructure conditions may allow a single or small number of operators.

The Report concluded that:

“Algoa Bay has excellent mariculture potential, but as the area along South Africa’s coastline with the highest diversity of endemic fish species, and containing most of the country’s functional ecosystems, it is also an ecologically important site. Conservation efforts, the established fishery sectors and the rapid industrialization of the bay and surrounds may have serious negative implications for attempts to develop mariculture in Algoa Bay”.

3.6 Draft Policy and Guidelines for finfish, marine aquaculture experiments and pilot projects in South Africa (2006)

The Draft Policy and Guidelines for finfish, marine aquaculture experiments and pilot projects in South Africa (Department of Environmental Affairs and Tourism, 2006c) precede the introduction of the policy for the development of a Sustainable Marine Aquaculture Sector in South Africa” (Government Gazette No. 30263,



September 2007). In this policy document, the rationale for the establishment of ADZs is clearly stated (p. 6, Section 4 - policy considerations):

“Marine aquaculture faces competition from other land and sea use activities, both commercial as well as recreational. It is a matter of high priority, therefore, to ensure that areas (sea, land and suitable estuaries) which may be suitable for marine aquaculture development, are zoned for this purpose.”

The policy goes on to state that the land use planning requirements and initial environmental impact assessment will take place in advance (presumably funded by the state) with the aim of reducing the entry costs for farmers and minimizing potential environmental impacts. The policy however, also explicitly states, “The National Environmental Management Act (NEMA), Environmental Impact Assessment (EIA) requirements will still be applicable”. In order to avoid possible conflicting use, the policy also makes clear that the development of an ADZ should take cognizance of other marine activities such as tourism, fishing and recreational activities as well as area management initiatives such as MPAs. The policy also highlights the need for research into finfish culture, and includes two of the suggested research and technology development programmes that deal with this topic (p. 14):

- Finfish technology platform programme, and
- Finfish cage culture development programme.

This policy therefore provides the framework for both the development of ADZs with the intention of encouraging the establishment of finfish cage farms, and the approach used in the SEA to select potential ADZ sites.

3.7 Guidelines for Mariculture Ranching (2006)

In terms of the Aquaculture Policy, sector specific guidelines that include Guidelines for Mariculture Ranching (Department of Environmental Affairs and Tourism, 2006d) are to be developed for various types of aquaculture activities. This marine ranching policy was developed as part of that process, and provides guidelines for submitting proposals to undertake marine ranching and stock enhancement, assessment of proposals and management and regulation of the sector.

It is unclear at this stage whether the establishment of finfish mariculture operations in Algoa Bay will also result in the introduction of finfish mariculture ranching. However, a Yellowtail Ranching project (DST, 2011a) is currently operational in the Agulhas area of the South-Western Cape. Beach-seine fishing is used as the principle method of catching fish and mobile fishing gears are used that are rowed out under the directions of a spotter to encircle a shoal of fish. A crew of between 14 and 20 persons, depending on the size of the net and the length of the haul, then haul the net to the shore. As the net approaches the shore, the ends of the net are brought together, and the trapped fish are driven into a bag (cod-end) in the middle of the net.

The project aims at developing and demonstrating technology whereby beach-seine encircled yellowtail is transferred to a towing cage, towed back to a selected holding site and then transferred into moored holding cages. Here the fish would be held, conditioned and marketed, thus enabling the fisher(wo)men to retain quality of their catch, and develop a profitable and sustainable yellowtail ranching venture, priding itself on product quality, environmental awareness and technical innovation.

3.8 Marine Aquaculture Sector Development Plan (2006)

The Marine Aquaculture Sector Development Plan (Department of Environmental Affairs and Tourism, 2006e) prepared by the Department of Environmental Affairs and Tourism envisions an internationally competitive, technology-based industry, supplying the demand for high-value fishery products. The purpose of the plan is to outline strategies that will give practical development affect to the marine aquaculture policy objectives, which are:-



- To create an enabling environment that will promote increased contribution from marine aquaculture to economic growth within the Accelerated and Shared Growth Initiative for South Africa (ASGISA) framework by supporting local economic development, ensuring that marine aquaculture adheres to internationally accepted environmental and fisheries standards; and growing the contribution of South Africa to global aquaculture production and increases South Africa's competitiveness.
- To encourage transformation and broader participation in the aquaculture sector.
- To develop regulatory and management mechanisms aimed at minimising adverse environmental impacts associated with aquaculture practices (e.g. sea ranching, sea-based cage farming, etc.).
- To encourage research aimed at increasing the resource base of marine aquaculture from the few species currently being farmed to a more diverse suite of species and fish farming technology.

In terms of the identification of Aquaculture Development Nodes, the sector plan indicates that the Eastern Cape Province has the second longest accessible coastline, about 38% of which was deemed to have potential for marine aquaculture development. The major areas that are suitable for development are around East London and Port Elizabeth and two "aquaculture development nodes" are proposed for the Coega and East London IDZ's (Industrial Development Zones). The location of the Port Elizabeth and Coega harbours offer opportunities for expanded sea-based production. The relative inaccessibility to the Wild Coast was found to be a major constraint to marine aquaculture development along the northern part of the Eastern Cape coastline.

Already In 2006 it was suggested that the western breakwater of the Port of Ngqura that provides shelter from the easterly swells, provides opportunities for sea-based mariculture, e.g. fish cage culture and oyster culture.

Apart from the above-mentioned mariculture policy and guideline documentation, a host of national legislation are also regarded as relevant to the development of ADZs and finfish farms. These numerous pieces of legislation are not integrated and are managed by a range of different regulatory bodies.



4. VIABILITY AND FEASIBILITY OF MARINE AQUACULTURE DEVELOPMENT

No feasibility study or business plan has been prepared for the proposed mariculture sites in Algoa Bay. Notwithstanding, it is important to note that mariculture is a complicated business and extensive research is required to plan, develop, establish and sustain a marine aquaculture plant. It requires a large investment of time and money over a period of years. By understanding the viability and conducting a feasibility study before starting a farming venture, a clear indication should be obtained how much it will cost to operate a farm and if the right conditions for growing a particular species are available in or at the proposed location.

In terms of viability it appears that supplies from capture fisheries are unlikely to increase in the coming decades, whilst the world population is currently over six billion and growing. Aquaculture producers will have a significant role in producing much needed animal protein to feed future generations. Due to freshwater scarcity in many areas of the world, mariculture is expected to be the future of aquaculture (see Section 2.5). Given the high start-up costs, most successful mariculture operations target high-value fish (e.g. ornamental fish) as well as food fish (e.g. red snapper, salmon and eels). The viability of the venture will therefore depend on:

- the availability of natural resources to support production;
- availability of seed stock;
- access to feeds and production technology (processing facilities);
- access to equipment and supplies such as boats, farm platforms, SCUBA gear, etc.;
- access to markets;
- access to health management, consultants and technical services (i.e. grafting technicians for oysters);
- a supportive regulatory environment; and
- public acceptance of the environmental impacts that inevitably accompany any food-producing endeavour.

The assessment of the viability and feasibility of the proposed venture should provide an indication of the following:

Construction of facility

- Number of cages required;
- Start and end date of the construction period;
- Nature, number and unit cost of tools used for construction;
- Number of man-days for successive construction phases – site preparation;
- Source, nature and scope of supplies used during construction;
- Direct and indirect labour costs; and
- Infrastructure requirements and cost to provide (harbours, fish factories, road infrastructure).

Operations

- Tonnage per annum;
- Sales and demand levels envisaged;
- Access to markets;
- Quantities and costs of inputs;
- Skills levels required (development of skills);
- Direct labour (number and cost);
- Availability of supplies in local area;
- Capital (funding and equipment, vehicles) and operational cost assessment; and
- Capacity for provision (supply) to local and overseas markets.



It appears that a major cause of failure in any aquaculture or mariculture operation is poor marketing. In addition, it also expensive to establish and make a success of aquaculture farming if the scale is not appropriate (per comm. Edwards). Mr. Edwards also indicated that more research is required to ascertain if aquaculture farming will work in the Algoa Bay area. In mariculture, farmers are competing with wild-caught commercial species. This can be beneficial, given that wild stocks are declining and seasonal availability can produce supply shortages that a mariculture producer can fill or schedule harvests accordingly. However, if wild catches are plentiful, the producer may not be able to sell the product at a price that covers costs.

A publication prepared by the Eastern Cape Development Corporation (2007) provides a checklist of pointers that should be considered to assess the viability and feasibility of a aquaculture project. In addition, the Eastern Cape Development Corporation indicates the start-up costs for a 300 ton cage culture operation (excluding hatchery) are in the order of R6 million for capital expenditure and R6 million for operating costs which includes a boat. A sea-based operation needs to attain economy of scale. Internationally, most marine fish are reared in sea cages, and a relatively large volume (minimum 1000 tons) is required for a business to achieve competitive production costs (for export) (Eastern Cape Development Corporation, 2009).

By way of a summary, it is essential to prepare a risk assessment that identified the probability of the event occurring, the significance thereof and what mitigation measures should be considered. In this context, it is important to consider the following in terms of viability and feasibility:

- The current experiences of the local marine aquaculture industry (i.e. the I & J pilot plant in Algoa Bay), expectations, level of institutional involvement, use of appropriate technology and the adequacy of public sector support measures to pioneer farmers;
- Aquaculture is a form of intensive farming with relatively high unit production costs -compared to industrial fisheries. The challenge is therefore to identify market opportunities for high value products that can be farmed profitably;
- Production costs tend to be higher during the set-up phase of a new aquaculture sector, because production techniques have not been optimized, and economies of scale have not yet been achieved;
- Without proper evaluation and mitigation of the impacts and implementation of responsible environmental management plans, aquaculture activities may degrade the ecosystems upon which they rely; and
- Access to appropriately structured, inexpensive funding could suffocated the venture;

Case study: Canadian aquaculture industry over 20 years

Several factors have contributed to the rapid development and growth of the Canadian aquaculture industry over the past 20 years. The specifics vary by species and region, but generally, the key factors were:

- an abundance of sites with favourable biophysical conditions;
- improved understanding and development of techniques to enhance survival rates of fish and shellfish at early life stages;
- development of improved broodstock;
- improvements in grow-out and harvest technology;
- individuals and firms willing to take risk and work to develop the industry
- receptive markets
- favourable regulatory regimes in the late 1980s and 1990s
- publicly funded development programs

Source: Government of Canada (1995)



5. SOCIAL CONTEXT OF THE FISHING INDUSTRY IN THE STUDY AREA

5.1 Aligning the study area and available statistics

The approach adopted for the preparation of the socio-economic and demographic profile of communities within the Nelson Mandela Bay area that surround Algoa Bay (the designated area for the proposed Mariculture finfish farms). The analysis entailed the specification of concentric circles representing areas within 20 km and 40 km from the centre point of the two preferred sites designated for the ADZs. This approach was used due to the need to ascertain the relative proximity of communities and settlements to the facility in order to understand the geographical impact of the location on residents in the study area.

In order to include the larger population of the study area, the assessment covers the communities with specific reference to “main places (as defined by Statistics South Africa) (within 20 km of the site). The following main places are found within a radius of 20km from the site Gqebera, Ibhayi, Motherwell, Port Elizabeth and Young Park. Within 40km of the site a total of 18 main places were identified which include the six main places within 20km from the ADZs.

The choice of radii for 20km and 40km is based on our observations of population distribution, economic activities and likely sources of procurement and labour in the areas surrounding Algoa Bay. We believe that this approach will offer a more realistic socio-demographic and economic profile of the population most likely to be affected by the development of the mariculture finfish farms.

Statistics South Africa in the 2001 Population Census Survey bases the statistics for the different zones on a combination of the main-places (which comprise various sub-places) as defined for the study area. Figure 13 is an accurate indication of the different concentric zones as applied to the municipal area with an exact indication of the proposed location for the development.

5.2 Limitation of the demographic analysis

We identified three limitations that curtailed the analysis, i.e.

- (1) comparisons are seldom possible between the 1996 and 2001 census years due to changes in the enumeration areas;
- (2) discrepancies in the 2001 population data for the area were uncovered and corrected were possible; and
- (3) a comparison between the population figures for 2001 (Census) and 2007 (Community Survey) is not possible due to the limited sample size used for the Community Survey.

It should be noted that the approach adopted for the assessment offers a relatively accurate indication of the socio-economic and demographic profile of the population residing in the specified zones. The latter statement should also be considered in the context of the nature and scope of the data used for the analysis.



Figure 13: Different concentric zones as applied in the study area with an exact indication of the location for the preferred and Alternative ADZs.

Source: Prepared from GIS data and information (Statistics South Africa, 2012)



5.2.1 Socio-demographic profile of the study area population

The following socio-demographic profile of the study area is based on data from the 2001 National Population Census Survey (Statistics South Africa, 2003). A summarised socio-demographic profile is presented in Table 3 for the 2001 census year.

An analysis based on the specified concentric zones suggests that 62.49% of the population residing in the area (i.e. within 40 km of the proposed site) live within 20 km the site proposed for development. An assessment based on the population groups suggests that 67.01% of the population that reside within 20 km of the site are Black African. The Coloured and White population respectively represents 11.67% and 19.81% of the total population residing within 20 km of the site.

Table 3: A socio-demographic profile of the study area based on the 2001 Census Survey

		Port Elizabeth			
		Within 20km		Within 40km	
Population:	Black African	420906	67.01%	592067	58.91%
	Coloured	73318	11.67%	235918	23.47%
	Asian	9488	1.51%	11368	1.13%
	White	124400	19.81%	165742	16.49%
	Total	628112	100.00%	1005095	100.00%
Gender:	Male	299682	47.71%	479734	47.73%
	Female	328430	52.29%	525361	52.27%
	Total	628112	100.00%	1005095	100.00%
Age classification:	0-18	205730	32.75%	346564	34.48%
	19-30	145365	23.14%	225974	22.48%
	31-40	98448	15.67%	157784	15.70%
	41-50	79284	12.62%	125186	12.46%
	51-65	65177	10.38%	101327	10.08%
	Over 65	34107	5.43%	48260	4.80%
	Total	628112	100.00%	1005095	100.00%

Source: Adapted from Statistics South Africa, 2003

5.2.2 Analysis of the study area population¹

The population of the study area, i.e. within 40 km of the proposed site, was estimated at 1 005 095 in 2001 (Statistics South Africa, 2003). As indicated, the enumeration areas used in the 1996 and 2001 Census survey do not correspond and can therefore not be used to accurately estimate the rate of population growth. Table 4 provides an indication of the population distribution of residents within 20 km of the site relative to 40 km of the site per population group for 2001.

¹ The Indian/Asian population only comprises 1.13% of the total population residing within 40 km of the site and therefore are not assessed as extensively as the other population groups.

**Table 4:** Breakdown of the population by population group for the study area (within 20 and 40 km) in 2001

Area	Population Group				Total
	Black African	Coloured	Asian	White	
Population within 20 km of the site	420906	73318	9488	124400	628112
Relative to Population of Nelson Mandela Bay	71.06%	31.05%	84.44%	74.93%	62.45%
Population of Nelson Mandela Bay	592 355	236 160	11237	166 026	1005778

Source: Statistics South Africa (2003)

The findings suggest that 62.45% of the Nelson Mandela Bay population within 40 km live within 20 km of the site. An analysis of the breakdown per population groups suggests that Black African living within 20 km of the site comprise 41.85% of the total Nelson Mandela Bay population. The proportion of Coloured and White people is 7.29% and 12.37%, respectively.

A discussion of key socio-demographic profile characteristics (population, education and age levels) is provided in the following sections. The analysis of the study area that follows is based on data from the 2001 South African Census (Statistics South Africa, 2003).

5.2.3 Analysis of education levels

An analysis of education levels in the study area for 2001 is provided in Table 5. The results indicate that 7.19% of persons living within 20 km of the site had no schooling, whereas 7.77% of the population within 40 km of the site had no schooling in 2001. The assessment further suggests that 65.84% and 68.07% of the population within 20 km and 40 km of the site had some level of education, but did not complete Grade 12. The findings indicate that 26.97% of persons living within 20 km of the site had a Grade 12, a Certificate/Diploma with a Grade 12 or a post-Matric qualification, as appose to 24.16% of the population living within 40 km of the site.

Table 5: An analysis of education levels for the population per specified zone in 2001

Education category	Within 20 km	Within 40 km
No schooling	41 960	72 124
Grade 1 - Grade 11	381 148	627 630
Grade 12/standard 10/form 5/Matric/NTC III	113 493	167 903
Certificate/Diploma with less than Grade 12	2 916	3 971
Certificate/Diploma with Grade 12	27 813	36 921
Post-Matric qualification	15 995	19 375
Total	583 325	927 924

Notes: N/A are excluded

Source: Statistics South Africa (2003)

5.2.4 Analysis of age levels

An analysis of the age levels among the population within 20 km and 40 km is intended to provide an indication of the population that could be considered economically active, i.e. persons between the ages of 19 and 65. The analysis that follows provides a broad indication of age categories for 2001. The findings are provided in Figure 14 and are based on the zones specified for the analysis.

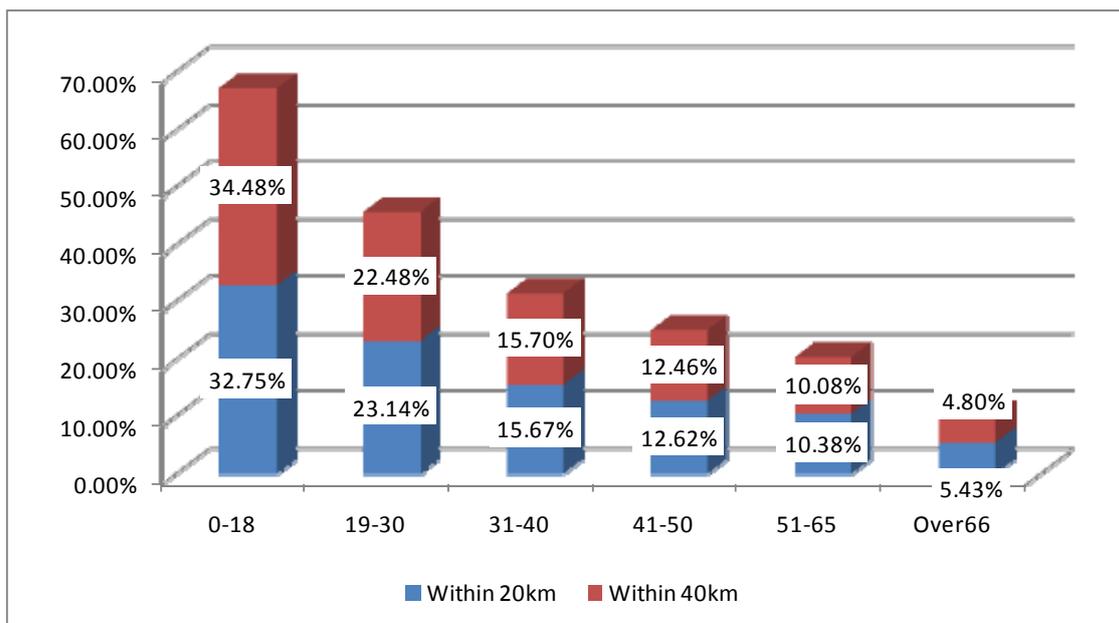


Figure 14: An assessment of percentage contributions to age levels of per identified zone for 2001

Source: Compiled from data provided by Statistics South Africa (2003)

The illustration provided in Figure 14 indicates that 32.75% of the population within 20 km of the development site are below 19 years of age, which represents 59.36% of all persons under 19 years of age within 40 km of the site. Our analysis also suggests that 61.82% of the population within 20 km from the site are in the working age category are between 19 and 65 years of age, while the working group within 40 km of the site represents 60.72% of the total population. The assessment indicates that every 1,62 persons who would normally be considered economically active (i.e. between 19 and 65 years of age) could support another person that is not economically active within 20 km of the site. The latter is slightly higher than the dependency ratio of 1,55 for the population residing within 40 km of the site.

A more detailed assessment of the population is presented in Table 6 suggest that the Black African population group of 18 years or younger represents 23.28% of the total population living within 20 km of the site proposed for development. Coloured and White residents under 19 years of age represent only 4.26% and 4.73% of the total population.

An analysis of dependency factors suggests that among the Black population residing within 20 km of the site, 1,61 persons that have the potential to be economically active could support another person not considered to be in an age category that represents an economically active person, i.e. 18 years of age or under and above 65 years of age. The dependency figures for the other population groups are 1,44 for Coloured and 1,76 for White residents.

Table 6: An assessment of age levels among residents in residing in the zones used for the analysis in 2001 by population group

Port Elizabeth: Within 20 km							
Age category	0-18	19-30	31-40	41-50	51-65	66 +	Total
Black African	146 214	104 917	67 144	51 941	35 724	14 965	420 905
Coloured	26 765	16 522	11 786	8 167	6 784	3 295	73 319
Indian or Asian	3 031	1 922	1 488	1 280	1 253	515	9 489
White	29 720	22 004	18 030	17 897	21 416	15 333	124 400
Grand Total	205 730	145 365	98448	79 285	65 177	34 108	628 113



Port Elizabeth: Within 40 km							
Age category	0-18	19-30	31-40	41-50	51-65	66 +	Total
Black African	209 562	142 586	95 668	72 874	50 728	20 649	592 067
Coloured	92 272	52 160	36 083	26 834	20 739	7 830	235 918
Indian or Asian	3 654	2 325	1 765	1 499	1 523	602	11 368
White	41 076	28 903	24 269	23 979	28 337	19 179	165 743
Grand Total	346 564	225 974	157 785	125 186	101 327	48 260	1 005 096

Source: Statistics South Africa (2003)

5.2.5 Analysis of household income levels

Table 7 provides the income ranges for households as defined by the specified radii from the centre of the site proposed for the development. Note that not all the respondents disclosed their income. Of those that did disclose their income, 21.14% of the households within 20 km of the development do not have an income, while 21.63% of households within 40 km of the site have no income. Furthermore, 35.21% of the households within 20 km of the development declared an income of R19 200 or less (excluding households with no income).

The findings suggest that more than 60.93% of the households that declared an income and reside within 20 km of the site, have an annual income of less than R76 801. The same proportional findings for households within 40 km indicate a percentage of 62.35%.

Table 7: Distribution of annual household income for each specified zone in 2001

Income category	Within 20 km		Within 40 km	
	Count	Percentage	Count	Percentage
No income	36 176	21.14%	57 286	21.63%
R1 - R4 800	7 794	4.55%	12 604	4.76%
R4 801 - R 9 600	26 793	15.65%	42 334	15.98%
R9 601 - R 19 200	25 685	15.01%	40 933	15.45%
R19 201 – R 38 400	24 296	14.19%	38 590	14.57%
R38 401 – R 76 800	19 728	11.53%	30 684	11.58%
R76 801 – R153 600	16 281	9.51%	23 871	9.01%
R153 601 - R307 200	10 312	6.02%	13 400	5.06%
R307 201 - R614 400	2 788	1.63%	3 397	1.28%
R614 401 - R1 228 800	578	0.34%	798	0.30%
R1 228 801 - R2 457 600	474	0.28%	649	0.25%
R2 457 601 and more	255	0.15%	321	0.12%
Grand Total	171 160	100.00%	26 4867	100.00%

Source: Adapted from Statistics South Africa (2003)

5.2.6 Employment and skills level analysis

A perspective of employment for the different zones in the municipal area is provided in Table 8 with specific reference to the number of employed, unemployed and not-economically active persons per population group.



Table 8: An assessment of employment by population group for 2001 based on specified radii from the site proposed for development

Port Elizabeth: Within 20 km					
Category of employment	Black African	Coloured	Indian/Asian	White	Grand Total
Employed	71268	20053	3451	52140	146912
Unemployed	108778	10599	591	3472	123440
Not economically active	116372	18561	2539	31533	169005
Total	296418	49213	6581	87145	439357
Dependency ratio per population group	0.32	0.69	1.10	1.49	0.50
Port Elizabeth: Within 40 km					
Category of employment	Black African	Coloured	Indian/Asian	White	Grand Total
Employed	98054	56700	3988	67609	226351
Unemployed	153904	36710	784	4686	196084
Not economically active	161717	62622	3099	43943	271381
Total	413675	156032	7871	116238	693816
Dependency ratio per population group	0.31	0.57	1.03	1.39	0.48

Source: Statistics South Africa (2003)

Table 9 indicates that 33.44% of the total population residing within 20 km of the site are employed, while unemployment is estimated at 28.10%. The proportion of employed for the Black African and White groups are 24.04% and 59.83% of the total population group, respectively.

An assessment of the dependency ratios for the zones is based on the premise that for each person who is employed, a factor of people is unemployed or economically inactive. The findings of the research for each of the zones suggest a dependency ratio of 0.50 and 0.48 for the total population within 20 km and 40 km, respectively. This implies that every employed resident could support two unemployed or economically inactive persons. The ratio for the Black African and White population groups within 40 km of the site is 0.31 and 1.39, respectively.

5.2.7 Skills levels by industry

A further assessment of employment levels is provided by economic sector, industry and by population group for the population residing within 20 km and 40 km from the designated site. The findings presented in Table 9 indicate the percentage employed per population group for the specified zones. Indications are that 64.79% of employed people within 40 km, reside within 20 km of the site.

The findings applicable to the zone within 20 km of the site and presented in Table 9 suggest that the tertiary sector employs 71.88% of the economically active population, followed by the secondary sector with 26.10%. The primary sector, which includes fishing, accounts for only 2.02% of the economically active population within 20 km from the site proposed for development. The Agriculture, Hunting, Forestry and Fishing sector employs 1.86% of the total economically active population residing within 20 km of the site, while the sector contributes 92.03% to the total employment applicable to primary sector.

Our assessment also suggests that 67.41% of the people within 40 km of the site are employed in the tertiary sector, with a strong emphasis on the Community, Social and Personal Services and Wholesale and Retail trade (35.06% and 26.73% of tertiary employment, respectively). Within 40 km of the site, persons employed in the primary sector accounts for 4.61% of total employment, with Agriculture, Hunting, Forestry and Fishing the largest contributor with 2.80% of total employment and 93.89% of the employed in the tertiary sector.



Table 10: Classification of employment per economic sector, industry and population group in 2001 for 20 km, and 40 km from the proposed ADZs for Mariculture Fish Farming

	Within 20km	Percentage	Within 40km	Percentage
		Within 20km		within 40km
Primary Sector	2673	2.02%	6084	4.61%
Agriculture, hunting; forestry and fishing				
Black African	1646	1.25%	3700	1.82%
Coloured	162	0.12%	857	0.42%
Indian or Asian	48	0.04%	51	0.03%
White	604	0.46%	1104	0.54%
Mining and quarrying				
Black African	102	0.08%	195	0.10%
Coloured	27	0.02%	69	0.03%
Indian or Asian	-	-	-	-
White	84	0.06%	108	0.05%
Secondary Sector	34454	26.10%	60318	45.69%
Manufacturing				
Black African	11802	8.94%	17131	8.41%
Coloured	5424	4.11%	17694	8.68%
Indian or Asian	665	0.50%	767	0.38%
White	9270	7.02%	12985	6.37%
Electricity; gas and water supply				
Black African	308	0.23%	461	0.23%
Coloured	45	0.03%	96	0.05%
Indian or Asian	15	0.01%	15	0.01%
White	217	0.16%	256	0.13%
Construction				
Black African	3625	2.75%	5132	2.52%
Coloured	977	0.74%	3065	1.50%
Indian or Asian	105	0.08%	132	0.06%
White	2001	1.52%	2584	1.27%
Tertiary Sector	94886	71.88%	137338	67.41%
Wholesale and retail trade				
Black African	10394	7.87%	13704	6.73%
Coloured	3613	2.74%	9758	4.79%
Indian or Asian	981	0.74%	1110	0.54%
White	9645	7.31%	12144	5.96%
Transport; storage and communication				
Black African	3730	2.83%	4616	2.27%
Coloured	964	0.73%	2456	1.21%
Indian or Asian	240	0.18%	249	0.12%
White	3804	2.88%	4943	2.43%
Financial, insurance, real estate and business services				
Black African	5057	3.83%	6416	3.15%
Coloured	1611	1.22%	3987	1.96%
Indian or Asian	364	0.28%	412	0.20%
White	9125	6.91%	10791	5.30%
Community, social and personal services				
Black African	15546	11.78%	20944	10.28%
Coloured	3867	2.93%	10098	4.96%
Indian or Asian	696	0.53%	804	0.39%
White	12775	9.68%	16306	8.00%
Private Households				
Black African	11322	8.58%	15624	7.67%
Coloured	915	0.69%	2664	1.31%
Indian or Asian	9	0.01%	21	0.01%
White	228	0.17%	291	0.14%
Total	132013	100.00%	203740	100.00%

Note: Excluded from the figures above are categories for Not adequately defined, Undetermined and Not Applicable

Source: Adapted from Statistics South Africa (2003)



5.2.8 Employment by occupation

An assessment of employment by occupation and population group is provided in Table 10 for the specified concentric zones. The findings suggest that within the 20 km zone from the site proposed for development, the Black African population are mostly employed as Sales and Services Elementary Occupations (25.72%), Mining, Construction, Manufacturing and Transport labourers (9.54%) or as Personal and Protective Services Workers (7.78%). Employment as various Professionals (35.63%) and Office Clerks (16.91%) are dominating among the White population group, whereas Coloured residents within 20 km are mostly employed as Office Clerks (12.15%) or Extraction and Building Trade workers (11.10%).

Table 11: Classification of occupations per population group in 2001 based on the concentric zones specified from the sites proposed for the Mariculture ADZs

Occupation	Population Group	Within 20km	Percentage	Within 40km	Percentage
			Within 20km		within 40km
Legislators and senior officials	Black African	153	0.11%	201	0.10%
	Coloured	33	0.02%	54	0.03%
	Indian or Asian	15	0.01%	15	0.01%
	White	283	0.21%	364	0.17%
Corporate managers	Black African	790	0.58%	1000	0.48%
	Coloured	480	0.36%	1160	0.56%
	Indian or Asian	262	0.19%	283	0.14%
	White	3886	2.88%	4777	2.29%
General managers	Black African	508	0.38%	664	0.32%
	Coloured	351	0.26%	697	0.33%
	Indian or Asian	243	0.18%	249	0.12%
	White	3121	2.31%	3763	1.80%
Physical, mathematical and engineering science professionals	Black African	520	0.39%	631	0.30%
	Coloured	194	0.14%	475	0.23%
	Indian or Asian	72	0.05%	81	0.04%
	White	1800	1.33%	2214	1.06%
Life science and health professionals	Black African	448	0.33%	578	0.28%
	Coloured	146	0.11%	277	0.13%
	Indian or Asian	165	0.12%	180	0.09%
	White	955	0.71%	1171	0.56%
Teaching professionals	Black African	1197	0.89%	1518	0.73%
	Coloured	288	0.21%	682	0.33%
	Indian or Asian	68	0.05%	71	0.03%
	White	1594	1.18%	1844	0.88%
Other professionals	Black African	1157	0.86%	1442	0.69%
	Coloured	550	0.41%	979	0.47%
	Indian or Asian	221	0.16%	248	0.12%
	White	4333	3.21%	5004	2.40%
Natural and engineering science associate professionals	Black African	933	0.69%	1210	0.58%
	Coloured	576	0.43%	1710	0.82%
	Indian or Asian	123	0.09%	138	0.07%
	White	1959	1.45%	2560	1.23%
Life science and health associate professionals	Black African	1364	1.01%	1853	0.89%
	Coloured	474	0.35%	1209	0.58%
	Indian or Asian	57	0.04%	63	0.03%
	White	1053	0.78%	1354	0.65%
Teaching associate professionals	Black African	2245	1.66%	3270	1.57%
	Coloured	599	0.44%	1921	0.92%
	Indian or Asian	63	0.05%	84	0.04%
	White	1033	0.76%	1350	0.65%
Other associate professionals	Black African	1474	1.09%	1847	0.88%
	Coloured	604	0.45%	1520	0.73%
	Indian or Asian	184	0.14%	217	0.10%
	White	4653	3.45%	5589	2.68%
Office clerks	Black African	3623	2.68%	4917	2.35%
	Coloured	2197	1.63%	5640	2.70%
	Indian or Asian	535	0.40%	631	0.30%
	White	8246	6.11%	10794	5.17%
Customer service clerks	Black African	1938	1.43%	2429	1.16%
	Coloured	897	0.66%	2192	1.05%
	Indian or Asian	173	0.13%	182	0.09%
	White	1848	1.37%	2364	1.13%



Table 11 (cont.)

Occupation	Population Group	Within 20km	Percentage	Within 40km	Percentage
			Within 20km		within 40km
Personal and protective services workers	Black African	5051	3.74%	6573	3.15%
	Coloured	1264	0.94%	3648	1.75%
	Indian or Asian	117	0.09%	138	0.07%
	White	2808	2.08%	3591	1.72%
Models, salespersons and demonstrators	Black African	2218	1.64%	2953	1.41%
	Coloured	925	0.68%	2297	1.10%
	Indian or Asian	385	0.29%	448	0.21%
	White	3698	2.74%	4745	2.27%
Market-oriented skilled agricultural and fishery workers	Black African	913	0.68%	1521	0.73%
	Coloured	87	0.06%	267	0.13%
	Indian or Asian	3	0.00%	3	0.00%
	White	243	0.18%	479	0.23%
Subsistence agricultural and fishery workers	Black African	-	0.00%	-	0.00%
	Coloured	-	0.00%	-	0.00%
	Indian or Asian	-	0.00%	-	0.00%
	White	-	0.00%	3	0.00%
Extraction and building trades workers	Black African	4879	3.61%	7742	3.71%
	Coloured	2008	1.49%	6778	3.25%
	Indian or Asian	94	0.07%	121	0.06%
	White	1483	1.10%	2313	1.11%
Metal; machinery and related trades workers	Black African	1990	1.47%	2893	1.39%
	Coloured	778	0.58%	2764	1.32%
	Indian or Asian	87	0.06%	105	0.05%
	White	2083	1.54%	3324	1.59%
Handicraft, printing and related trades workers	Black African	393	0.29%	480	0.23%
	Coloured	165	0.12%	525	0.25%
	Indian or Asian	15	0.01%	18	0.01%
	White	234	0.17%	288	0.14%
Other craft and related trades workers	Black African	1516	1.12%	2033	0.97%
	Coloured	547	0.41%	1607	0.77%
	Indian or Asian	36	0.03%	48	0.02%
	White	480	0.36%	681	0.33%
Stationary-plant and related operators	Black African	488	0.36%	751	0.36%
	Coloured	179	0.13%	569	0.27%
	Indian or Asian	9	0.01%	9	0.00%
	White	90	0.07%	165	0.08%
Machine operators and assemblers	Black African	2605	1.93%	3754	1.80%
	Coloured	1312	0.97%	4178	2.00%
	Indian or Asian	54	0.04%	57	0.03%
	White	593	0.44%	815	0.39%
Drivers and mobile-plant operators	Black African	4648	3.44%	6266	3.00%
	Coloured	766	0.57%	2205	1.06%
	Indian or Asian	96	0.07%	117	0.06%
	White	1007	0.75%	1517	0.73%
Sales and services elementary occupations	Black African	16710	12.37%	22800	10.92%
	Coloured	1440	1.07%	4367	2.09%
	Indian or Asian	78	0.06%	99	0.05%
	White	529	0.39%	679	0.33%
Agricultural; fishery and related labourers	Black African	999	0.74%	2329	1.12%
	Coloured	54	0.04%	441	0.21%
	Indian or Asian	3	0.00%	3	0.00%
	White	30	0.02%	63	0.03%
Mining; construction; manufacturing and transport labourers	Black African	6200	4.59%	8237	3.94%
	Coloured	1174	0.87%	4137	1.98%
	Indian or Asian	70	0.05%	88	0.04%
	White	736	0.54%	1105	0.53%
Grand Total		135054	100.00%	208803	100.00%

Source: Adapted from Statistics South Africa (2003)

Notes: Totals exclude Not Applicable (N/A) and Undetermined



6. INITIAL OUTCOME AND IDENTIFICATION OF IMPACTS

6.1 Initial outcomes of the baseline socio-economic analysis

The premise for the establishment of marine finfish cage aquaculture is provided by a set of policy documents and various guidelines prepared by various government departments. The principle policy adopted by the National Government is the “Policy for the Development of a Sustainable Marine Aquaculture Sector in South Africa” (Republic of South Africa, 2007). In this policy document, the rationale for the establishment of ADZs is clearly stated (p. 6, Section 4 - policy considerations).

The Draft National Aquaculture Strategic Framework (Department of Environmental Affairs and Tourism, 2010) indicates that aquaculture development is a priority of Government. The Government recognises the opportunities presented by aquaculture and is committed to creating appropriate platforms for access to and optimal utilisation of available resources and existing infrastructure to facilitate new economic activity to create opportunities for wealth creation and gainful employment whilst ensuring the government’s key overriding constitutional obligation for a fairer and equitable society is upheld.

The Strategic Environmental Assessment (Anchor Environmental, 2011) should also be read together with the Marine Aquaculture Policy (Republic of South Africa, 2007) that gave rise to a “Marine Aquaculture Policy Implementation Plan 2009-2014” (Department of Environmental Affairs and Tourism, 2009b), wherein the need for the establishment of aquaculture development zones was identified as one of the 11 key required implementation programmes. Various sites were considered as part of the assessment and the outcome of the analysis indicated the following:

“At this time, the DAFF has communicated that it wishes to proceed with establishing ADZs in the Eastern Cape Province. Based on the relative cost values, we recommend that two potential sites within Algoa Bay (Port Elizabeth/Coega 2 & 3) are subject to detailed EIA assessment with a view to declaring ADZs, with a third site in Algoa Bay (Port Elizabeth 1) and a site to the east of Cape St Francis (St Francis 1 actually off Jeffreys Bay) be considered as alternatives”.

In keeping with the policies and guidelines for the development of marine aquaculture, the project should also be desirable from a societal cost-benefit perspective and demonstrate the need (see Section 2.5) and desirability (refer to Section 3) for the development of mariculture. In addition to the assessment of the legislative context, the desirability would also be informed by an assessment of the socio-economic impacts. In order to determine whether or not this is achievable, the impacts that may arise from the such development must be assessed. The latter forms part of an assessment of the impacts, which is covered as part of the Impact Assessment phase of the Environmental Impact Assessment process.

6.2 Identification of impacts

The following impacts have been identified for assessment in the impact assessment phase:

- User conflict relate to several impacts as stated below:
 - Specialist tourism and eco-tourism activities (e.g. shark cage diving, whale watching, recreation fishing)
 - Existing and planned Marine Protected Areas in Algoa Bay and St Francis Bay
 - Port Traffic Zones – ships entering the bay, holding before proceeding to port, and movement between Port Elizabeth and Coega ports
 - Fishing grounds and vessel navigation routes in Algoa Bay



- Polluting - were fish farming causes damage to other marine life in proximity to the farm
- Existing marine aquaculture activities (pilot plant)
- Potential impact on existing fish industries that operate in the area (i.e. squid fisheries/recreational/commercial fisheries)
- Impact on infrastructure (land-based infrastructure (harbours/fishing factories/road infrastructure)
- Impact of limited available skilled labour for finfish cage culture;
- Impact on direct and indirect employment during the establishment and operational phases
- Impact on coastal real estate due to aesthetic nature of views and sense of place
- Ability of local businesses to supply goods and services including fish processing, nets and maintenance, transportation, packaging, containers, diving services, machinery and equipment
- Seasonality in traditional fishing sector vs all year round source of income and employment in an area that has a small agriculture and fishing sector and few alternatives to seasonal fishing and agriculture
- Accessibility to and opportunities for development of an export market for marine aquaculture product.

Once the impacts are assessed, which are not limited those mentioned above, other factors such as impacts associated with potential project expenditure are analysed. In order to provide context to the assessment of societal benefits and costs, the impacts would be assessed as part of the Impact Assessment phase of the EIA process.



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APPENDIX A: LIST OF PRIMARY INTERVIEWS

Name of Stakeholder	Designation / Organisation /Business	Contact details	Personal Interview (PI) / Telephone Interview(TI) - date
Mr R Dana & Mr Brian Adamson	Harbour Master & Assistent Harbour Master, Transnet National Ports Authority	(041) 507 1710 (041) 507 1900	02 Febr 2012, PI
Captain Faisal Sultan	Deputy Harbour Master, Transnet National Ports Authority	(041) 507 1910 083 397 5222	02 Febr 2012 PI
Mr Danie Ferreira & Me Nicolene Niekerk	Foreman & Senior Technician, Transnet National Ports Authority	(041) 507 1629	01 Febr 2012 PI
Dr Dave Tate	Development Studies NMMU	(041) 504 2504	01 Febr 2012 PI
Mr John Allen	Vice president: Ski Boat Club	082 578 9051	07 Febr 2012 TI
Mr Charl Kotze	Local Fisherman, Algoa Bay	(041) 581 3953 083 642 1533	01 Febr 2012 PI
Mr John Tudehope	Chairperson Algoa Bay Yacht Club	(041) 585 4058 082 854 3961	03 Febr 2012 PI
Mr Lloyd Edwards	Raggie Charters	084 552 2277	04 Febr 2012 PI
Dr Paul Martin	Environmental Consultant	073 252 4111	06 Febr 2012 TI
Mr Diederick Nel	Eyethu Fishing (PTY) Ltd	041 585 5683	03 Febr 2012 PI
Mr Pietie Steyl	Itemba Labantu Fishing	(041) 454 7556	02 Febr 2012 PI
Mr Anton Viljoen & Dino Moodley	Talhado Fishing	041 585 1652 0832825835	06 Febr 2012 TI
Mr Arno Rabe	Trade Motto	083 399 8405	06 Febr 2012 PI
Mr Garry Scholtz & Mr Michael Young	National Regulator for Compulsory Specifications (NRCS) (not part any more of the SABS)	083 325 3699 021 526 3400 083 632 4612	07 Febr 2012 TI
Mr John Allen	Vice president: Ski Boat Club	082 578 9051	07 Febr 2012 TI
Mr Maruis van Heerden	Fisherman	(041) 585 0887 082 440 1615	03 Febr 2012 PI
Mr Martin Giers	Chairperson Ski Boat Club	082 554 4808	04 Febr 2012 PI



APPENDIX B: DECLARATION OF INDEPENDENCE

Declaration of Independence

(in terms of Chapter 5 of the National Environmental Management Act of 1998)

I hereby declare that I/we have no conflicts of interest related to the work of this report. Specifically, I/we declare that I/we have no personal financial interests in the property and/or development being assessed in this report, and that I/we have no personal or financial connections to the relevant property owners, developers, planners, financiers or consultants of the development. I/we declare that the opinions expressed in this report are my/our own and a true reflection of my/our professional expertise.

CV OF SPECIALIST CONSULTANT (abridged)

Prof Jonathan Z Bloom (born 26 June 1967) holds a Ph.D. in Commerce from the University of Stellenbosch (2001) together with MComm (*cum laude*) (1992), HonsBComm. (*cum laude*) (1991) and BComm (1989) from the same institution. Jonathan Bloom is managing director of Umcebisi Business Advisers. He has received several grants from private sector enterprises to conduct research on various aspects of commerce and business. This enabled him to expand his knowledge base and develop his expertise in the socio-economic and related fields, which ultimately lead to the commissioning of various consulting projects from a variety of government, public and private sector institutions in Southern Africa.

Jonathan also conducts management education and training development workshops on viability analysis and economic impact studies for both the private sector and relevant government departments at national and provincial level. In addition, he has authored various international articles, written several insight abstracts for leading newspapers in South Africa and presented papers at several international symposia on innovative business and applied research.

He has conducted more than 60 socio-economic impact assessments as an independent consultant for real estate developments throughout South and Southern Africa over the past 10 years. Jonathan has research skills in design and implementation of research projects from both a qualitative and quantitative perspective. Statistical analysis expertise and methodological aspects of research projects are also part of the input he provides to clients. He majored in statistics and business economics and his background in statistical modelling of economic aspects related to projects and cost-benefit assessments have been used to assist clients with the assessment of socio-economic impacts associated with projects.

Prof Jonathan Z Bloom (PhD)
February 2012