CHAPTER 6

Fisheries and coastal livelihoods

CHAPTER 6:
Fisheries and coastal livelihoods

Integrating Author	Louise C. Gammage[1],
Contributing Authors:	Zanne Zeeman[1], Annastacia Mpala[1], Marieke Norton[1], Kelly Ortega-Cisneros[1], Catherine D. Ward[1]
Peer Reviewer	Nina Rivers

[1] Amethyst Independent Facilitation

[2] Nelson Mandela University

Recommended citation: Gammage, L. C., Zeeman Z., Mpala, A., Norton M., Ortega-Cisnero, K. & Ward, C. (2025) Strategic Environmental Assessment for the proposed Boegoebaai Port and Special Economic Zone. Fisheries and Coastal Livelihoods. Report to CSIR.

Executive Summary

The coastal waters along the Northern Cape support small-scale and nearshore fisheries that remain essential to local livelihoods. Operating predominantly from Port Nolloth, Hondeklipbaai, and Kleinzee, fishers use small vessels or shore-based methods to harvest a diverse range of species. Fishers target linefish (mainly for snoek and Cape seabream), although fishers face increasing pressure from ecological change and regulatory constraints. West coast rock lobster fishery has been another major source of income, with small-scale, nearshore and offshore commercial rights allocated to several of these communities. However, the stock is heavily depleted, and illegal harvesting poses an ongoing threat. Netfishing using gillnets plays a limited role in supporting local food security and household incomes, particularly for multi-activity households. Aquaculture – particularly abalone and kelp farming – has emerged as an important and growing alternative, offering formal employment and entry into value-added markets.

Commercial fisheries operating offshore along the west coast of South Africa such as small pelagic purse seine, demersal trawl, and hake longline sectors, are critical to national seafood production and export. These fisheries target sardine, anchovy, hake, and horse mackerel – many of which rely on the west coast's inshore waters as vital spawning and nursery areas. The stretch of coastline between St Helena Bay and the Orange River is especially important, functioning as the main nursery zone for small pelagic species. Shallow waters north of Port Nolloth are key juvenile habitats for shallow-water hake.

The area surrounding Boegoebaai is not only ecologically significant but also culturally important. It contains ancestral graves, sacred natural features, and culturally significant plants used by Nama communities in traditional practices. These landscapes predate mining activities and are deeply embedded in local oral histories and cultural identity. The area also includes traditional fishing grounds historically used by small-scale fishers, many of whom have lost access due to mining-related restrictions. This convergence of ecological value and cultural heritage highlights the importance of inclusive and careful development planning in the area – ensuring that the foundations of community identity, spiritual practice, and livelihood are not compromised by industrial expansion. Four towns form the primary coastal communities adjacent to the proposed Boegoebaai development: Alexander Bay, Port Nolloth, Kleinzee, and Hondeklipbaai.

- Alexander Bay is a small, formerly prosperous mining town situated on the Orange River near the Namibian border. Historically reliant on diamond extraction through Alexkor, the town has experienced economic decline, deteriorated infrastructure, and limited local employment as mining has scaled down. The area holds deep cultural significance for Nama communities, with ancestral graves and culturally important plants like Buchu (Agathosma spp) found near Boegoebaai. While agriculture and tourism are emerging as alternative livelihoods, opportunities remain scarce, and the town is marked by rising unemployment and social vulnerability. Fishing is not a key livelihood activity, although recreational fishing is popular with the mouth of the Orange River a popular fishing spot among recreational fishers. Key stakeholder interviews revealed that many were positive were positive due to the possibility of improved local employment.

- Port Nolloth is a traditional fishing community with deep intergenerational ties to the sea. Once a hub for copper and diamond exports, it now supports several rights holders which include Hake longline, Hake handline, Hake deep-sea trawl, netfish, small pelagics, linefish, west coast rock lobster (WCRL) nearshore, WCRL commercial, and a fish processing facility. The Aukotowa small-scale cooperative was established in 2018 and hold small-scale fishing rights (primarily targeting Snoek and Cape Bream), as well as commercial rights for WCRL and offshore hake offshore although they do not have the capacity to utilise these offshore rights. These small-scale fishers traditionally use bakkies and operate close to shore. Access to traditional fishing grounds in the area has become increasingly restricted due to marine mining activity, while high fuel costs, stock depletion, and limited infrastructure (i.e., only one jetty remains operational) pose additional challenges. Persistent water shortages have further weakened the town's tourism potential and broader development prospects. Interviews with key stakeholders has revealed that business

owners have a positive attitude towards the proposed development as they see the value for job creation, although the fishing cooperative take a negative view due to impacts related to ocean squeeze due to reduced areas of operation and potential negative impacts on the local ecosystem.

- **Kleinzee**, a former De Beers mining town, has transitioned toward aquaculture and seasonal tourism. It now hosts abalone and seaweed farming operations that provide formal employment and skills development opportunities. With intact infrastructure and relatively high service delivery, Kleinzee is more stable than neighbouring towns and is seen as a pilot site for marine-based economic diversification and over the past years, aquaculture has been the primary employer in Kleizee. Seasonal tourism, driven by wildflowers, birdwatching, and shipwreck trails, also contributes to the local economy. Recreational fishing has always been a way of life in Kleinzee; however, stakeholder report it has been severely impacted by siltation caused by mining operations. Stakeholder interviews further reveal positive and negative sentiments expressed regarding the proposed development. Tourism stakeholders from Kleinzee are generally positive as they feel this could lead to increased revenue, although some stakeholders expressed concerns about pollution on the coast due to increased vessel traffic.

- **Hondeklipbaai** is a small, traditional fishing village historically linked to copper exports and commercial fishing. Today, its residents depend on small-scale fishing and increasingly on tourism-related activities. The community faces numerous constraints, including declining west coast rock lobster stocks, limited fishing rights, competition from larger fleets, and poor infrastructure – particularly road access, water supply, and sanitation. Nonetheless, fishing remains central to local identity, and tourism is gradually growing through flower season visitors and 4x4 trails. The Longtime Hondeklipbaai Fishing primary cooperative was established in 2018. These fishers primarily use handlines to catch linefish, focusing on species like snoek and Cape seabream, and hoop nets for WCRL. During the snoek season, many fishers from Cape Town come to the area to catch snoek. Additionally, the fishers have the rights to harvest beachcast kelp and live kelp, which they have subcontracted. Stakeholders in Hondeklipbaai, especially the fisheries cooperative take a neutral position on the proposed development due to their distance from Boegoebaai.

Potential Benefits of the Proposed Development:

The Boegoebaai Port and SEZ development presents an important opportunity to stimulate inclusive economic growth and promote strategic investment in the Northern Cape. If designed and implemented with sustainability, equity and local participation at its core, the project could offer a range of environmental, economic and social benefits:

- **Fisheries-linked economic diversification and job creation.** The project could unlock substantial employment and livelihood opportunities directly and indirectly linked to the fisheries sector and beyond (e.g. tourism). Aquaculture operations may also benefit from expanded water access, energy supply, and downstream support services. The diversification of income streams may reduce vulnerability in communities currently reliant on declining or seasonal fisheries and could mitigate some of the negative impacts associated to ocean squeeze.

- **Improved infrastructure for small-scale fisheries and coastal livelihoods.** Upgrades to marine and land-based infrastructure will improve operational efficiency and safety for fishers in towns like Port Nolloth. Improved service delivery could support new or underutilised value chains such as dried fish products, kelp processing and marine tourism. Expanded water supply and electrification may also enable shore-based aquaculture activities and provide opportunities for co-operative-led enterprises to scale up production. Improved harbour infrastructure may reduce post-harvest losses and improve the quality and shelf life of landed catch.

- **Local skills development and capacity building in marine sectors.** Technical training and mentorship programmes offer the potential to build capacity within fishing and coastal communities. This includes upskilling in marine safety, vessel maintenance, post-harvest handling, seafood processing, aquaculture operations, environmental monitoring, and marine stewardship. Targeted training for youth and women may broaden access to previously male-dominated or

capital-intensive sectors, supporting inclusive local development. Skills development linked to port and SEZ operations may also enable intergenerational transfer of knowledge and provide pathways into formal marine employment sectors.

- **Strengthening of community-based fisheries governance and co-management.** If implemented inclusively, the development could catalyse improved local governance arrangements, offering a platform to strengthen fisher cooperatives and associations through improved access to finance, business support services, and policy engagement spaces.

- **Support for aquaculture-driven livelihood expansion.** Access to better-quality water, energy, and transport systems could significantly strengthen the viability of coastal aquaculture initiatives, particularly in towns like Kleinzee. Formalised support may enable pilot projects in integrated multi-trophic aquaculture (IMTA), seaweed farming, or small-scale mariculture to grow into sustained livelihood opportunities. Infrastructure could also enable greater value addition through local processing, packaging, and cold storage, increasing income retention within communities.

- **Enhanced fisheries compliance and marine resource protection.** The port may improve the logistical feasibility of deploying patrol vessels and monitoring crews to combat illegal, unreported, and unregulated (IUU) fishing in the northwest of the EEZ. Strengthened surveillance and compliance capacity may benefit both conservation objectives and local fishers, by protecting their resource base from overexploitation and ensuring more equitable access to shared stocks.

- **Foundations for fisheries-linked tourism and heritage economies.** By improving transport, utilities and market access, niche tourism offerings that include local fisheries culture (e.g. seafood festivals, fisher-for-a-day experiences, or heritage boat tours) could be established. Infrastructure upgrades may also allow communities to monetise intangible heritage and cultural assets (e.g. traditional knowledge, coastal landscapes, artisanal crafts), particularly during the flower season.

- **Increased resilience to climate and market shocks.** Diversified income opportunities and improved infrastructure may help coastal communities adapt to environmental and economic volatility. With fisheries increasingly impacted by climate change (e.g. shifting stocks, marine heatwaves) and market pressures (e.g. rising fuel costs), support for improved aquaculture, tourism and seafood value chains together with opportunities to diversity skills beyond fisheries, could enhance household resilience by reducing reliance on any single resource or season.

Potential Negative Impacts of the Proposed Development:

The benefits discussed are contingent on addressing the risks and impacts identified. Key negative impacts identified include:

- **Marine ecosystem degradation.** Construction and operation pose threats to critical marine ecosystems. The development site lies adjacent to key nursery and spawning grounds for commercially important species such as sardines and hake. Disruption of these habitats through dredging, sedimentation, and noise pollution could lead to larval mortality, recruitment failure, and long-term population declines, undermining ecological stability and the viability of west coast fisheries.

- **Ocean squeeze and spatial conflict.** Spatial competition in an already congested marine zone will be intensified. This will negatively impacts already marginalised coastal and small-scale fishers who already face increasing displacement due to overlapping claims from mining, offshore oil and gas, conservation, and industrial shipping activities. Access to traditional fishing areas has already been reduced by mining security restrictions (e.g., fishers are no longer able to trailer vessels to Boegoebaai), and further limitations threaten the sustainability of small-scale livelihoods. Climate change impacts, such as sea-level rise and altered species distributions, exacerbate these pressures.

- **Pollution and habitat disturbance.** Port construction activities, including dredging and increased vessel traffic, are likely to elevate pollution levels and degrade water quality. Sediment resuspension may smother benthic habitats and affect filter-feeding organisms, while hydrocarbon

leaks and ballast water discharge may introduce contaminants and invasive species. Underwater noise from heavy machinery and ships could disturb fish behaviour and migration patterns. These impacts may reduce local biodiversity, impair ecosystem functioning, and decrease the availability of fish for both commercial and subsistence fishers.

- **Gentrification and community displacement.** As infrastructure improvements and new employment opportunities attract outside investors and higher-income groups, gentrification pressures on the existing communities will increase. This could risk raising property values and living costs, pricing out long-standing residents, and eroding traditional livelihoods. In towns like Port Nolloth and Alexander Bay, where unemployment is high and services are limited, such shifts could deepen socio-economic inequalities and displace vulnerable populations. Social cohesion may be disrupted, particularly if communities perceive that development benefits are externally captured.

- **Marginalisation of local stakeholders.** Perceptions from local stakeholders are that current governance arrangements and stakeholder engagement processes are dominated by government and private sector interests, with limited inclusion of small-scale fishers, Nama communities, women, and informal resource users. This reproduces a legacy of inadequate consultation linked to previous development efforts in the region, contributing to community frustration and mistrust. Moreover, current frameworks fail to recognise indirect and hidden stakeholders or the complexity of the marine and coastal social-ecological systems, leading to poorly tailored interventions and reduced legitimacy.

- **Cultural heritage loss.** The Boegoebaai area holds deep spiritual and cultural importance for local Nama communities. At least 17 ancestral gravesites and several sacred or historically significant sites, including the ruins of the Rietfontein farmhouse, exist within or near the project footprint. The coastline also includes traditional WCRL fishing grounds and landscapes that form part of oral history and cultural identity. Without proper protection and recognition, these sites risk being disturbed or destroyed by construction and associated industrial activity, severing connections between communities and their heritage.

- **Fragmented impact assessment and governance gaps.** The current approach to environmental and social impact assessment is fragmented, with separate assessments required for individual projects that comprise the development. This siloed approach risks underestimating the cumulative and long-term impacts on fisheries, ecosystems, and coastal communities. Furthermore, regulatory scale mismatches between national frameworks (such as the National Environmental Management Act, the Marine spatial Planning framework and the Marine Living Resources Act) complicate coordination and undermine holistic planning. Without developing an cross-cutting, integrated assessment and governance mechanism for the proposed development, key risks will be overlooked, and mitigation measures rendered ineffective.

Key Recommendations:

The proposed development presents an opportunity to advance South Africa's economic ambition and just energy transition whilst addressing regional social and economic disparities. The following recommendations are made in relation to fisheries and coastal communities:

- **Commission a comprehensive fisheries impact study.** An expanded, independent specialist study should assess the cumulative, cross-sectoral impacts of the proposed development on fisheries – must be commissioned in support of the Environmental and Social Assessment processes related to the various projects undertaken as part of the development. This must include spatial and temporal overlap with oil and gas, marine mining, shipping, and aquaculture, along with ecological, socio-economic and cultural dimensions.

- **Establish a multi-stakeholder marine governance platform.** A formal, cross-sectoral platform that is representative of all stakeholders should be created to facilitate early warning, spatial planning, conflict mediation, and joint decision-making in the area. Special effort should be made to involve historically excluded or hidden stakeholders, especially women, youth, and customary right holders.

- **Design transparent, inclusive and ongoing stakeholder engagement processes.** Stakeholder engagement must shift from extractive consultation to pro-active co-creation where communities are seen as collaborators. This includes early engagement during project scoping, participatory identification of risks, shared oversight of monitoring, and mechanisms for sustained involvement over the life of the development. Engagement should be culturally appropriate, multilingual, and accessible. Grievance mechanisms should be responsive and legally supported.

- **Integrate cumulative impact assessment and regulatory harmonisation.** Current impact assessments are fragmented. The Environmental and Social Assessments must be coordinated with the various marine, coastal and environmental governance frameworks to capture cumulative and transboundary effects. Scale mismatches in governance should be addressed by facilitating regulatory alignment through interdepartmental processes and shared data systems.

- **Invest in skills development and just transition support.** Training and education programmes should be developed in partnership with local institutions to support local community members, including youth and women, to capitalise on the opportunities for diversification of livelihood activities within and beyond the marine sectors. Programmes must be flexible and localised to address educational barriers.

- **Secure affordable housing and basic services for coastal residents.** Gentrification risks linked to inward migration and infrastructure growth should be anticipated. The development of affordable, climate-resilient housing and essential services in the effective towns must be considered in the planning process. Avoiding the displacement of already vulnerable households is essential to social sustainability in the area.

- **Develop an integrated monitoring, evaluation and learning framework.** Develop a participatory monitoring, evaluation and learning framework to track local ecological indicators (e.g. fish stock health, habitat condition, pollution levels) and socio-economic indicators (e.g. income stability, participation in governance, displacement).

- **Prioritise access to benefits for disadvantaged and historically marginalised groups.** Deliberate mechanisms should be built into the SEZ governance structure to ensure that benefits – such as job creation, contracts, or training – are accessible to those with the least existing opportunity. This includes fisherwomen, Indigenous groups, and informal workers. Procurement and hiring policies should favour local co-operatives and small enterprises.

- **Integrate ecosystem-based Marine Spatial Planning.** Marine spatial planning linked to the SEZ should prioritise ecosystem function, fisheries nursery areas, and connectivity. Special attention must be given to ensuring spatial justice by maintaining or restoring access corridors for small-scale fishers and reducing encroachment by incompatible marine industries.

It is crucial to ensure the development's benefits are equitably shared among all stakeholders, fostering resilient and empowered coastal communities. Aligning the Boegoebaai development with South Africa's broader sustainability goals can set a benchmark for future marine and coastal projects if done well.

Contents

Tables

Figures

Abbreviations and Acronyms

BCLME	Benguela current large marine ecosystem
CSIR	Council for Scientific and Industrial Research
DFFE	Department of Forestry, Fisheries and the Environment
EEZ	Exclusive economic zone
EBSA	Ecologically or Biologically Significant Marine Area
ESIA	Environmental and Social Impact Assessments
GDP	Gross Domestic Product
GIS	Geographic information system
MLRA	Marine Living Resources Act of 1998 (South Africa)
NCEDA	Northern Cape Economic Development Trade and Investment Promotion Agency
NEMA	National Environmental Management Act
NGO	Non-governmental organisation
NPO	Nonprofit organization
NSRI	National Sea Rescue Institute
SANEDI	South African National Energy Development Institute
SEA	Strategic Environmental Assessment
SEZ	Special Economic Zone
SIA	Social Impact Assessment
SP	Sub place
StatsSA	Statistics South Africa
TAC	Total Allowable Catch
TAE	Total Applied Effort
TNPA	Transnet National Ports Authority
PUCL	Precautionary Upper Catch Limit
WCRL	West coast rock lobster

CHAPTER 6. FISHERIES AND COASTAL LIVELIHOODS

6.1 OVERVIEW

Sustainable development planning in South Africa's marine and coastal systems is both complex and critically important due to the convergence of diverse ecological, social, and economic pressures within these vital socio-ecological systems. These biodiverse coastal regions are vital economic zones supporting tourism, fisheries, and other marine industries. The complexity of planning is underscored by complicated the governance framework, which includes 23 international and 26 national legal frameworks, along with 51 associated norms and standards (Taljaard *et al.*, 2019) This complexity often results in uneven application and implementation of regulations, resulting in governance gaps. Addressing the various pressures requires coordinated governance that acknowledges the complexity and scale of interactions within marine social-ecological systems (Sowman and Sunde, 2024).

Scientific research and technological innovation are pivotal in informing sustainable coastal and marine management. Adaptive governance frameworks are essential to address the dynamic nature of these environments through collaborative, system-based approaches involving multiple and diverse stakeholders (e.g. Cvitanovic *et al.*, 2015; Jarre *et al.*, 2018; Stephenson *et al.*, 2021). In South Africa, the Integrated Coastal Management (ICM) Act of 2010 emphasizes sustainable practices tailored to local contexts, promoting community-based models that empower stakeholders in decision-making regarding coastal resources (McCarthy and Thomas, 2017; Rebelo, 2021). Similarly, the Marine Living Resources Act (MLRA) No. 18 of 1998 advocates for equitable marine resource management through the establishment of forums and councils, ensuring sustainability and inclusive participation via co-management frameworks (Cochrane et al., 2015). Although the requirement for transparent and inclusive processes are embedded within South African legislation, government has historically not been able to effectively execute these processes (e.g. (Rivers *et al.*, 2022).

South Africa's Marine Spatial Planning (MSP) Framework reinforces these principles by focusing on co-management and collaboration with local communities. It promotes transparent, inclusive processes to balance economic, social, and ecological objectives for sustainable marine resource management. This framework integrates area-based plans across sectors, agencies, and government levels to achieve diverse management objectives at the ocean-coastal interface. Ecosystem-based MSPs are required to maintain ecosystem services while achieving sustainable development goals (Lombard *et al.*, 2019; DFFE, 2021).

As the country advances toward its sustainable development goals, integrated coastal management is crucial for ensuring the long-term viability of coastal ecosystems and the communities that depend on them (Goble *et al.*, 2014; Malan, 2018). Effective management requires holistic strategies that integrate scientific knowledge, meaningful community participation, and policy alignment to address challenges such as climate change, resource depletion, and socio-economic inequality.

This report focuses on the intersection of fisheries and people. Our impacts and recommendations are centred on mitigating potential negative impacts on people who live in communities adjacent to the proposed development, as well as leveraging potential opportunities that this development may hold for them. This report should be read in conjunction with Annex Report 1 and 2 (see Appendix), as well as the Marine Ecology Expert and Socioeconomic specialist reports for the SEA with the socio-economic report providing detail information on the benefits and potential negative impacts related to livelihoods.

6.1.1 Terms of reference

The Fisheries and Coastal Livelihoods Expert Group conducted a mixed-methods assessment of fisheries and coastal livelihoods in the context of the development. This component is important for understanding complexities related to fisheries and coastal livelihoods, ensuring that recommendations promote long-term full-spectrum sustainability (Foley *et al.*, 2020) within the linked marine social-ecological system (e.g. Ostrom, 2009). Researchers conducted a situational analysis by developing stakeholder typologies and community profiles to examine current fisheries and coastal livelihoods in the area of interest and immediately adjacent communities. This involved a review of secondary data, semi-structured interviews with key scientific experts and select local stakeholders, and ground-truthing through fieldwork. Findings

were integrated to identify potential positive and negative impacts of the planned development and propose evidence-based recommendations for future Environmental and Social Impact Assessments (ESIAs). This study aimed to deepen understanding of fisheries and coastal livelihoods in the area of interest and make high-level recommendations that can strengthen stakeholder engagement and guide strategic planning as it relates to fisheries and coastal livelihoods for the proposed development.

6.1.2 Conceptual framing

The dynamic nature of human-environmental factors informs our overarching approach, and we take a social-ecological systems lens, explicitly recognising the coupled nature of social, economic, and environmental interactions. Using this approach, we first identify current fisheries and livelihood activities in the area of interest before determining the potential consequences the proposed development holds for fisheries and coastal livelihoods on these activities by taking a mixed methods approach.

Social-ecological systems in support of sustainable development

Social-ecological systems are complex, integrated systems that view humans as part of nature, emphasising the interconnectedness of the social, economic, and environmental dimensions (Berkes and Folke, 1998). We adopt Bouamrane *et al.*'s (2016) definition: 'interdependent and linked systems of people and nature that are nested across scales.' Fisheries are complex, adaptive social-ecological systems (e.g. Ostrom, 2009), vital to the socio-economic fabric of coastal communities, as they are essential sources of food, income, and cultural traditions. Despite the ever-increasing recognition that achieving sustainability depends on integrated, system-based approaches linking human and natural systems, governance frameworks and management approaches remain sector-based and discipline specific (Virapongse *et al.*, 2016).

The social-ecological system approach has been linked with various applications, including ecosystem services (Daily, 1997; Partelow and Winkler, 2016), resilience (Berkes and Folke, 1998) and numerous other governance theories (Folke *et al.*, 2005; Cox *et al.*, 2016). It remains important to consider the role of scale within social-ecological systems and in the governance of ocean-based activities such as fisheries. In social-ecological systems, system dimensions that drive decisions and the levels at which they are taken affect other system dimensions in unintended and often destructive ways (Vervoort *et al.*, 2012). Governance issues in the Anthropocene are often multilevel and cut across jurisdictional scales while linking decision-makers horizontally and vertically (Berkes, 2017). Human environmental activities have causes and consequences measured at different levels and scales. The challenge presented by scale issues is a key characteristic of the complexity of the human-environmental system, especially where multi-level decision-making is required (Gibson *et al.*, 2000; Cash *et al.*, 2006; Vervoort *et al.*, 2012). At the same time, whilst scale issues have been addressed more explicitly in the system's ecological (natural) components, social scales are often ill-defined (Vervoort *et al.*, 2012). A targeted approach to social scales is crucial, particularly in recognising and addressing disparities in community resource access, decision-making authority, and traditional knowledge integration (Strand *et al.*, 2022).

The South African marine environmental social-ecological system is no different. Whilst the large-scale ecology is relatively well-understood (Moloney *et al.*, 2013; Blamey *et al.*, 2015; Jarre *et al.*, 2015; Dorrington *et al.*, 2018; Sink *et al.*, 2019), our knowledge of the interactions within the social system needs attention. Whilst much work has recently been done in terms of understanding the social contexts in fisheries (Jarre *et al.*, 2018; Duggan *et al.*, 2020; Gammage and Jarre, 2020; Sowman, 2020), ocean and coastal mining; (Petrova and Marinova, 2013; Roche and Bice, 2013; Baker *et al.*, 2016) and MSP (Kidd and Shaw, 2014; Dorrington *et al.*, 2018; Zaucha and Gee, 2019; Saunders *et al.*, 2020), this knowledge is fragmented at best. At the same time, work carried out in fisheries (e.g. Blamey *et al.*, 2015; Jarre *et al.*, 2018; Gammage *et al.*, 2021) highlight the challenges associated with system-based governance where scale mismatches are pervasive. While South Africa has embraced the concept of the blue economy as a new economic frontier, this has raised concerns on the country's approach to blue growth where social justice and environmental sustainability principles are not centred in the ocean economy (Sowman and Sunde, 2024). When it comes to the marine space, the network of interested or potentially impacted stakeholder communities expands to include other coastal communities, national governments, neighbouring states, researchers, industry and civil society (Roche and Bice, 2013).

In addition, the global food system has become increasingly intricate, connecting food production, processing, and consumption across great geographical distances (Gaasland *et al.*, 2020). These connections, or couplings, facilitate the flow of commodities like food products, information, and technology from where they are produced to where they are consumed, with financial and other resources returning to entities involved throughout the value chain (Plieninger and Bieling, 2012). Telecoupling[1] within the fishery system is important for this study as marine impacts that affect fisheries within the bounds of the proposed development could potentially have distant implications for South African fishery fleets (and consequently livelihoods), far beyond the reach of the immediate impact of the proposed development.

6.1.2.1 Overarching approach

Figure 6-1 illustrates a theory of change developed for the study. Infrastructure development and the Boegoebaai Port and SEZ's associated long-term activities will have direct and indirect impacts on the local scale. Direct impacts primarily concern impacts related to the physical components of social-ecological systems as they relate to marine ecosystems and coastal zones (determined by the Marine Ecology expert group in this SEA), while indirect impacts are related to the human/social components and manifest as consequences of the development. These potentially include competing space (ocean and coastal squeeze), impacts on commercial and small-scale fisheries (and value chains) and local industry (discussed in the Socio-economic specialist study). The stakeholder typology (Annex Report 1) and ensuing community profiles (Annex Report 2) inform the impact assessment. Our overarching aim in this report is to generate recommendations for the proposed development as it relates to coastal livelihoods and fisheries. This approach was supported by a collaborative, reflexive, and mixed-methods framework, drawing on the expertise of researchers and stakeholders to develop informed, context-specific recommendations.

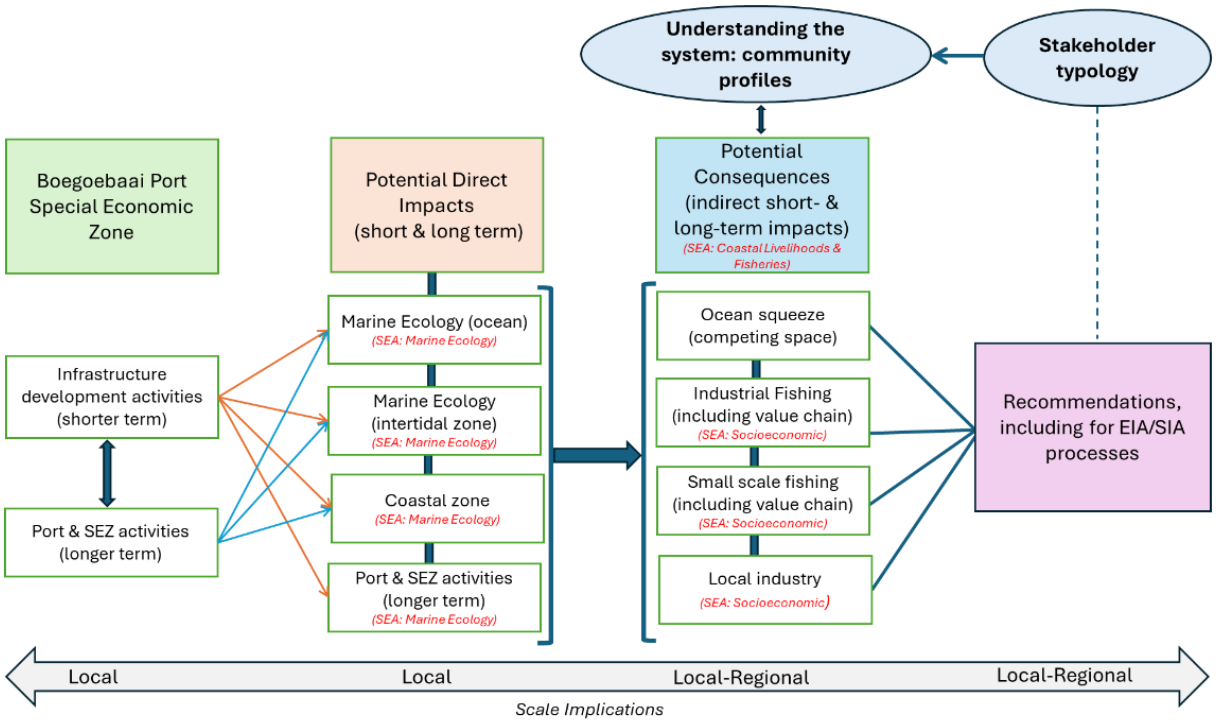

Figure 6-1: The theory of change that informs the approach taken in this research

[1] Telecoupling is a concept that describes socioeconomic and environmental interactions over distances. It involves distant exchanges of information, energy, and matter (e.g., people, species, goods, ecosystem services, and financial capital) between the coupled social-ecological system (IPBES, 2018)

6.1.2.2 Area of interest

Under Work Package 1, the area of interest focuses on a local spatial scale (33 500 ha) covering the extent of the proposed port and SEZ largely from on a land use perspective. This area falls within the Northern Cape coastline which spans 313 kilometres alongside the Atlantic Ocean and extends over three (out of six) local municipalities within the Namakwa District Municipality, namely the Richtersveld, Nama Khoi and Kamiesberg (Ramasar, 2004). Looking seaward and extending beyond the immediate boundary of Work Package 1, lies the southern Benguela – this larger, interconnected ocean space and its fishery resources play a critical role in supporting the economic and cultural stability of local communities along the west coast. Therefore, this chapter considers fisheries operating at multiple scales, focusing on fisheries operating in South Africa's Exclusive Economic Zone along the west coast, to the two main regional fishing nodes in the Northern Cape Province, namely Port Nolloth and Hondeklipbaai.

The immediate landward area of Boegoebaai under consideration for the SEA is under restricted access linked to diamond mining activities under Alexkor,[2] where the area is currently uninhabited. Therefore, the communities of interest to examine local coastal livelihoods are selected based on their proximity to Boegoebaai, prioritising existing fishing communities and fishery related activities where relevant. These communities of interest fall under the Namakwa District Municipality. Four towns were selected, namely Alexander Bay, Port Nolloth, Kleinzee and Hondeklipbaai. Table 6-1 below details municipal jurisdiction for the selected towns, as well as the primary reason to include the select towns as communities of interest.

Table 6-1: Communities of interest for fisheries and coastal livelihoods

District Municipality	Local Municipality	Community (based on Main Place)	Reason to include as a community of interest
Namakwa	Richtersveld	Alexander Bay	Closest proximity to Boegoebaai
		Port Nolloth	Traditional fishing community
	Nama Khoi	Kleinzee	Aquaculture activities
	Kamiesberg	Hondeklipbaai	Traditional fishing community

6.1.2.3 Methods

This study made used of a mixed-methods approach to develop a comprehensive stakeholder analysis that included developing a stakeholder typology (see Annex Report 1), developing a description of fisheries and community profiles for the communities of interest (see Annex Report 2), and determining potential impacts of the proposed development. Here we provide a broad overview of the methods used, where details are provided in the Annex reports. Table 6-2 outlines key methodological steps, approaches, data sources, and intended outcomes.

Table 6-2: The broad methods used throughout the Fisheries and Coastal livelihoods research

Method Step	Methods Used	Data Sources & Tools	Intended Outcome
Stakeholder Analysis Framework	Desktop review and research Expert validation through consultation	Publicly available data, literature, conceptual frameworks (Reed et al. 2009, Gammage & Strand 2021) Published research, government directories, socio-economic and environmental reports, news articles, tourism/community profiles, and online industrial workshops	Holistic identification of interconnected stakeholders Preliminary stakeholder landscape and draft stakeholder list Identification of previously overlooked or marginalised stakeholders; refining the stakeholder list

[2] See https://alexkor.co.za/

Method Step	Methods Used	Data Sources & Tools	Intended Outcome
		Inputs from CSIR, Transnet, higher education & research institutions, DFFE, SANParks, and fishery community representatives	
Stakeholder Categories	Desktop research drawing on results from Stakeholder Analysis	Master typology (Gammage & Strand 2021)	Clear differentiation of stakeholder groups by scale and type (government, NGO/NPO, civil society, private sector)
Stakeholder Relationships	Social network analysis drawing on results from Stakeholder Analysis	Third-party sources and expert inputs	Stakeholder interests and preferred engagement methods to inform potential impacts
Description of Fisheries	Desktop review Expert validation through consultation	Peer-reviewed publications and relevant published grey literature – such as journal publications, government documents and research documents Consultation of relevant subject matter experts	Overview of pertinent national fisheries in South Africa, west coast fisheries and fisheries in the Northern Cape Province
Community Profiles	Coastal livelihood typologies Desktop literature review Ground truthing through fieldwork and interviews	Drawing on the stakeholder analysis, typologies of coastal livelihoods for communities of interest were developed Review of relevant peer-reviewed publications and published grey sources Fieldwork (4–6 Sept 2024) in all communities of interest; Semi-structured interviews (12 local stakeholders), Microsoft Forms for data capture, bilingual interview guides (English/Afrikaans) Consultation of relevant subject matter experts	In-depth understanding of community composition, diversity, and key livelihood activities (agriculture, conservation, fisheries, mining, tourism)
Aspects and Impacts	Desktop research Expert validation through consultation	Consolidation of findings from stakeholder analysis; description of fisheries; and community profiles Integration of findings from sensitivity analyses from marine ecology and socioeconomic expert groups under Work Packages 1 and 2	Potential positive and negative impacts of the proposed development High level evidence-based recommendations to strengthen stakeholder engagement processes and guide strategic planning as it relates to fisheries and coastal livelihoods.

6.2 DESCRIPTION OF THE RECEIVING ENVIRONMENT

Drawing on the Annex reports, this section provides a summary of the description of the receiving environment in relation to the proposed development by providing an overview of fisheries and coastal livelihoods, the area and communities of interest (Annex Report 2) and stakeholder typology (Annex Report 1).

6.2.1 Fisheries[3]

The southern Benguela is one of the most productive marine ecosystems globally because of its nutrient-rich upwelling system. This upwelling supports a high plankton biomass, which forms the foundation of the marine food web, leading to abundant fish populations, particularly small pelagic species such as sardines and anchovies. These species are crucial for commercial fisheries and the overall health of marine ecosystems (Hutchings *et al.*, 2009). The southern Benguela fisheries are vital to coastal communities' livelihoods, providing direct employment in fishing, processing, and distribution and supporting thousands of households (Griffiths *et al.*, 2010; Isaacs, 2013; Sowman *et al.*, 2013; Norton, 2015; Hara *et al.*, 2017; Jarre *et al.*, 2018). The importance of these fisheries transcends economic value, being deeply interwoven with the cultural and social identities of these communities, contributing to both food security and the preservation of traditional practices. This evolution highlights the critical role of these resources in supporting the economic and cultural stability of local communities).

Beyond their local importance, the economic contributions of these fisheries extend nationally, with fisheries playing a key role in South Africa's gross domestic product (GDP), contributing although less than 1%, also generating foreign exchange earnings through exports (Brick and Hasson, 2016). The South African fishing industry comprises two main components: wild capture fisheries and aquaculture. The former includes the commercial, small-scale, subsistence, and recreational sub-sectors. Nationally, the commercial sector provides direct employment to 28,000 individuals and supports indirect employment for between 100,000 and 130,000 people (Brick and Hasson, 2016). The commercial and recreational fisheries are reported to catch over 250 marine species, although fewer than 5% of these are actively targeted by commercial fisheries, which comprise 90% of the landed catch (Wilkinson and Coppin, 2024).

The small-scale sector, established through the Small Scale Fisheries Policy (SSFP) (DAFF, 2012), was created to acknowledge those fishers who depend on marine living resources for direct food security or those using traditional fishing methods (e.g. Sowman, 2011; Sowman and Sunde, 2021). Nationally, there are more than 169 small-scale fishing communities that support approximately 8027 active small-scale fishers with an estimated 85% of them harvesting linefish (DFFE, 2023a). The informal nature of smalls scale fisheries pre-SSFP makes determining exact trends in catches and trends difficult, although this is expected to improve in future. Various sources that the number of small-scale fisheries have remained relatively constant over the last 3 decades. Small-scale fisheries commonly use small, open boats generally less than 10 m in length that mainly operate close to the shore and are only allowed access to nearshore target species. In addition to commercial (including linefishery) and small-scale sectors, recreational fishing occurs along the coastline comprising shore angling and boat-based fishing.

The southern Benguela ecosystem is increasingly vulnerable to external pressures such as climate change, overfishing, and habitat degradation. These pressures present significant threats to fish stocks, with potentially severe consequences for the livelihoods that rely on them (Allison *et al.*, 2005; FAO, 2014; Ortega-Cisneros *et al.*, 2021). Climate change affects both fish populations and their ecosystems, resulting in shifts in species distribution and abundance (e.g. Ortega-Cisneros *et al*., 2021). Variations in climate, such as rising sea surface temperatures and changing oceanographic conditions, can disrupt traditional fishing practices and reduce the availability of key species (Gammage *et al.*, 2017; Jarre *et al.*, 2018; Martins *et al.*, 2019; Gammage and Jarre, 2020). Furthermore, overfishing, including illegal, unreported and unregulated (IUU)[4] fishing exacerbates these challenges by depleting fish populations, thereby threatening the sustainability of fisheries (Jarre *et al.*, 2018; Gammage and Jarre, 2020). Other anthropogenic pressures on the west coast marine social-ecological system include mining which restricts coastal access and offshore oil and gas exploration, which restricts ocean access (Masterson, 2021; Masson, 2022).

[3] See Annex Report 2, pages 10-33 for the complete Fisheries description.

[4] South Africa has historically permitted very limited foreign fishing access, preferring to reserve its fisheries for domestic vessels. Some evidence suggests that in recent years, foreign industrial fleets have been detected operating inside South Africa's EEZ, especially off the west coast of the country. It must be noted that the origin of foreign fleets in South African waters is not limited to illicit entrants. Some foreign-flagged longliners operate legally under agreements for tuna and swordfish, landing their catch in South African ports under the auspices of regional tuna management organisations (ICCAT and IOTC) using issued licenses or joint-venture rights to a small number of foreign vessels for highly migratory species. (Standing, 2017).

6.2.1.1 Fish and fisheries in the area of interest

Both the small pelagic fisheries and the hake fisheries operate south of Boegoebaai, with the demersal hake longline, large pelagic longline and demersal trawl fisheries operating further offshore. Figure 6-2 shows the fishing intensity in the Exclusive Economic Zone (EEZ) of South Africa for selected fisheries important to the area of interest, along the west and southwestern coasts, whilst Figure 6-3 shows the proposed development in relative to these fishery areas.

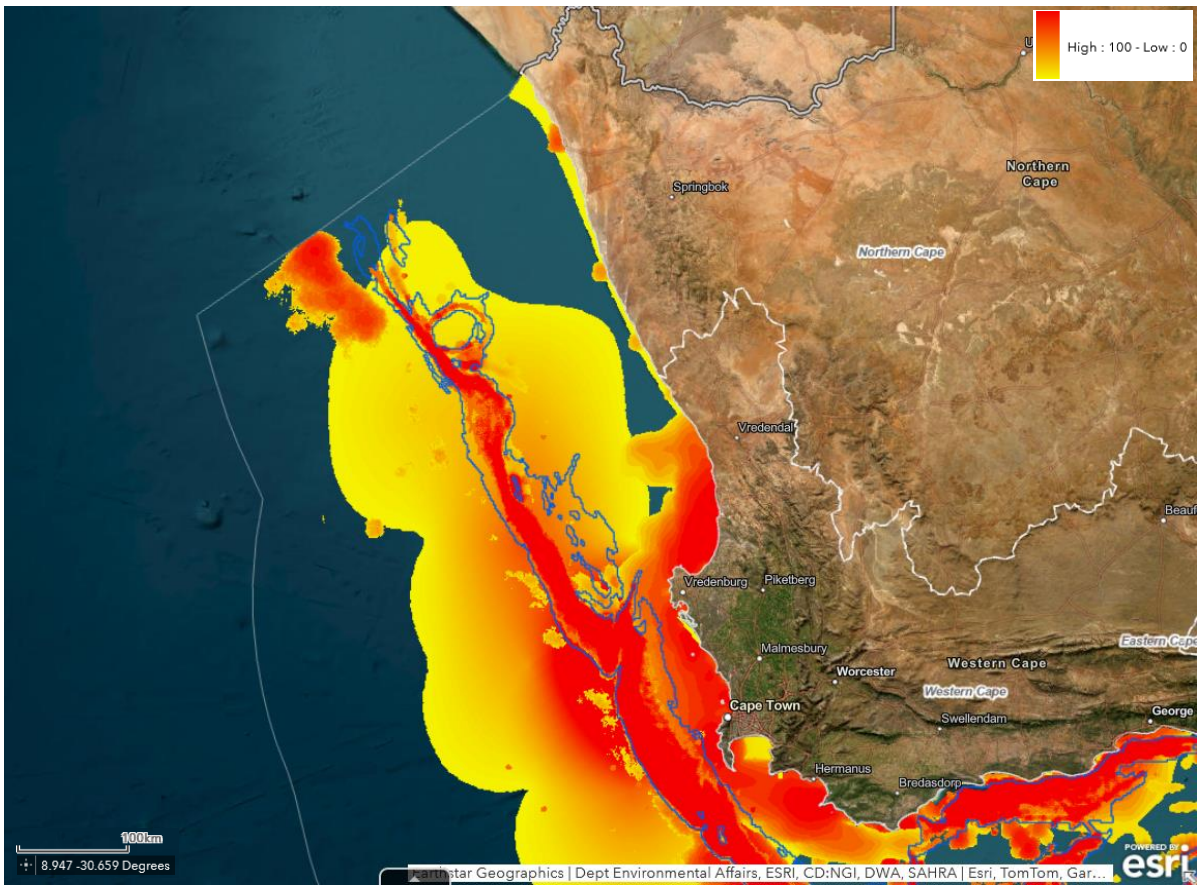

Figure 6-2: Fishing intensity of fisheries (trawl, hake longline, small pelagics, pelagic longline, tuna pole, linefish, net fish, kelp harvesting, West Coast Rock Lobster) with a focus on the west coast of South Africa (extracted from OCIMS Coastal Viewer; DFFE, 2024)

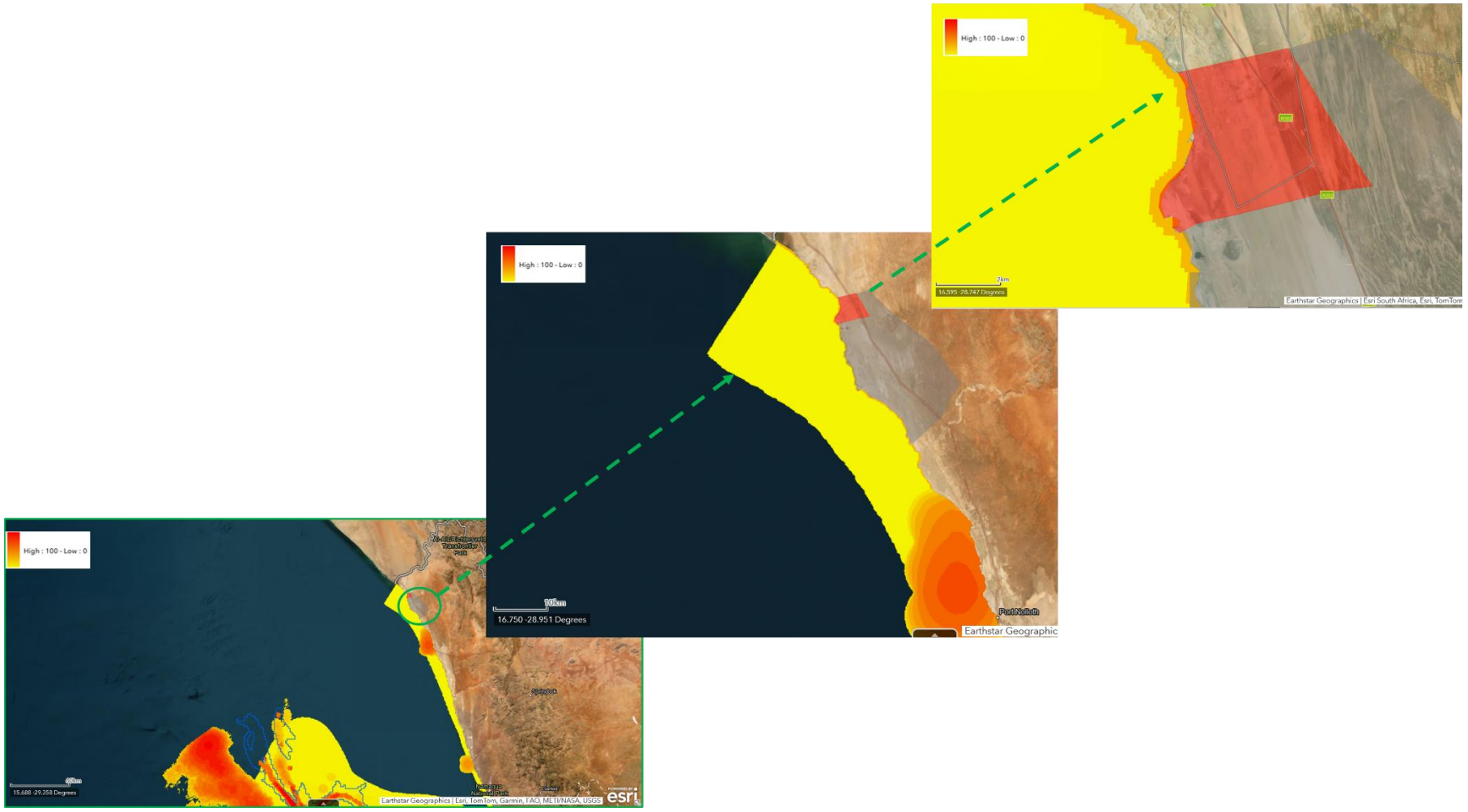

Figure 6-3: Map showing the Proposed development in relation to fishing intensity in the immediately adjacent area. The activity close to the coast is mostly related to linefish, net fish, kelp harvesting and West Coast Rock Lobster).

Fishing intensity is higher closest to Port Nolloth, immediately adjacent to the proposed development (shown in the middle panel). The grey polygon represents the SEZ, whilst the red polygon represents the proposed port precinct (extracted from OCIMS Coastal Viewer; DFFE, 2024)

Notably, the area between St Helena Bay and the Orange River is an important nursery ground and the main area for recruitment of all small pelagic species on the Southern African coastal shelf (Hutchings et al. 2002; Coetzee et al., 2008). Therefore, the small pelagic fisheries may be adversely affected by the development, with the potential of impacting the small pelagic fishing fleet further south. The same caution applies to the commercial hake fisheries as the coastal area around Boegoebaai serves as nursery grounds for these species (Hutchings et al., 2002; Grüss et al., 2016). The area north of Port Nolloth is also known to have a high average density (kg nautical-mile-2) of shallow water hake (Merluccius capensis) (DFFE, 2023a).

- Stock distribution, spawning and recruitment of key species

Spawning, the process through which fish release and fertilize eggs, is essential for sustaining and replenishing fish populations. Environmental factors such as water temperature, light intensity, and ocean currents significantly influence when and where spawning occurs for many fish species. Recruitment refers to the stage when juvenile fish grow and eventually integrate into the adult population. This developmental phase is crucial in the fish life cycle, as the survival and maturation of juveniles directly affect the overall health and stability of fish populations. The South African coastline is dominated by seasonally variable and sometimes strong currents and most species have evolved highly selective reproductive patterns to ensure that eggs and larvae can enter suitable nursery grounds situated along the coastline. Coastal oceanographic dynamics in southern Africa, including eddies, filaments, retroflections, and offshore Ekman transport,[5] often lead to the dispersal and loss of nutrient-rich shelf waters to the open ocean. These processes create challenges for the retention of planktonic eggs and larvae produced by broadcast spawners, thereby limiting successful spawning outcomes, despite the region's wide shelf edge and productive waters (Fowler and Boyd, 1998; Huggett *et al.*, 1998; Roy and Fréon, 2001; Hutchings *et al.*, 2002; Sink *et al.*, 2019). Consequently, many fish species in this area have evolved specific reproductive strategies to ensure that larvae remain in or return to coastal nursery grounds.

The inshore waters along South Africa's West coast serve as vital nursery areas for numerous pelagic and demersal fish species. While the central Namibian shelf also functions as a nursery ground, its importance is considered less critical. Additional nursery grounds in South Africa include the Natal Bight on the East Coast and the Agulhas Bank on the South Coast. Each of these nursery areas is closely associated with a corresponding spawning region, as well as mechanisms for transport, recirculation, and nutrient-rich upwelling along the coast or at the shelf edge (Hutchings *et al.*, 2002, 2009).

Figure 6-4 highlights the main reproductive habitats of southern African fisheries. Species such as hake, sardine, anchovy, and horse mackerel are broadcast spawners that release large quantities of eggs, which are then dispersed by ocean currents (Hutchings et al., 2002). These species primarily spawn on the central and western Agulhas Bank. Coastal upwelling and the north-eastward flow of surface waters create a coastal jet current originating from the Agulhas Bank and extending along the West coast. This current is instrumental in transporting eggs and larvae to nursery areas along the West coast. At Cape Columbine, the jet diverges, forming offshore, alongshore, and inshore flow components (Hutchings *et al.*, 2002, 2009). Importantly, the coast immediately adjacent to the area of interest serve as important nursery grounds for commercially important west coast fisheries (Hutchings *et al.*, 2002, 2009). Any seaward disturbance in this area will likely have a large negative impact on these nursery grounds (L. Shannon, pers. comm.).

[5] Eddies, filaments, retroflections and offshore Ekman transport are complementary mesoscale-to-basin ocean-circulation processes—swirling rings, narrow jet-like plumes, boundary-current loops and wind-driven cross-shore drift—that move, mix and redistribute water, heat, nutrients and organisms between coasts and the open sea, shaping marine ecosystems and climate interactions (Woods Hole Oceanographic Institution, 2025).

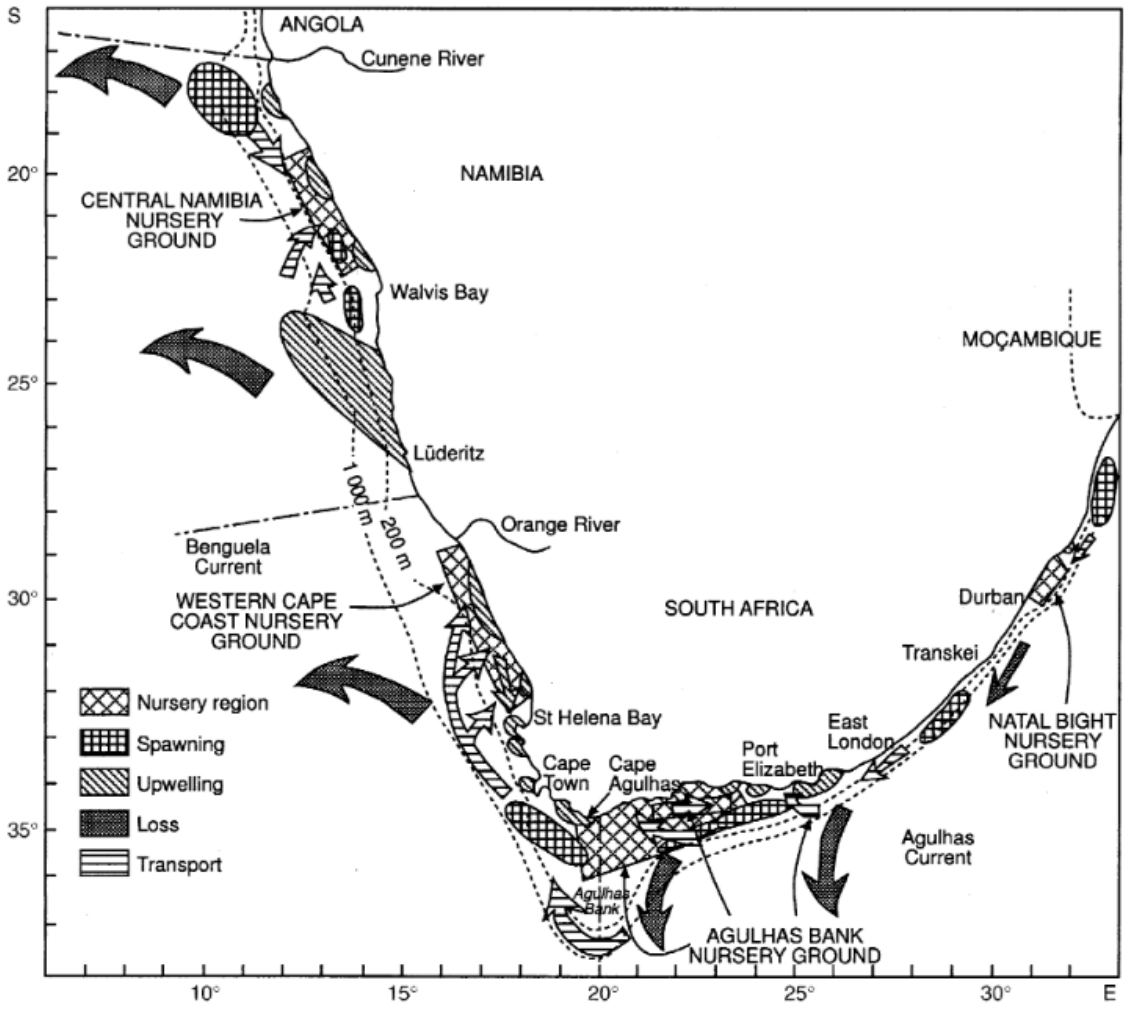

Figure 6-4: Spawning, transport and nursery grounds for pelagic fish in the southern African region. Pelagic fish use strong convergent flow on the western Agulhas Bank and the jet currents outside the upwelling cells to transport eggs and larvae from the Agulhas spawning grounds to the west coast nursery grounds (Hutchings et al., 2002)

Table 6-3 below highlights the fish species that are key to fisheries of interest. This table provides a summary of their distribution, habitat, spawning areas and seasons, and movement patterns and recruitment.

Table 6-3: A summary of stock distribution, spawning and recruitment of fish species important for the fisheries of interest

Species / Group	Distribution & Habitat	Spawning Areas & Seasons	Movement Patterns & Recruitment	Additional Notes
Sardine (*Sardinops sagax*)	Coastal waters within the 200 m isobath along most of South Africa's coastline, including cool-temperate west coast and warm-temperate south coast areas (Coetzee *et al.*, 2019)	West coast: Year-round spawning, peak Aug–Mar (Mhlongo *et al.*, 2015); Some eggs from south coast transported to west coast nursery grounds	Juveniles from south coast migrate back there to spawn; west coast juveniles move to the south-east Coast (Jun–Nov) Complex population structure with prolonged spawning, diverse reproductive strategies, and various recruitment mechanisms (Sink *et al.*, 2019)	Multiple population groups (west coast, south coast, mixed origin) (Teske *et al.*, 2021)
Anchovy (*Engraulis capensis*)	Continental shelf of the southern Benguela system, overlapping with sardines	Spawns primarily on the Agulhas Bank (Oct–Mar, peak mid-summer: Nov–Dec) (van der Lingen and Huggett, 2003); occasionally on west coast when warm Agulhas waters pass Cape Point	Migrate from west coast nursery areas to stable spawning grounds on the Agulhas Bank between Jul–Sep. Eggs and larvae transported by coastal jets to west coast nursery areas where juveniles settle. Since 1994, a shift in spawning distribution toward the east-central Agulhas Bank (van der Lingen *et al.*, 2001)	Similar habitat and transport mechanisms to sardines
Cape Horse Mackerel (*Trachurus t. capensis*)	West coast, across the Agulhas Bank, extending east to Gqeberha, within the 500 m isobath (Barange *et al.*, 1998)	Year-round spawning with two main peaks: May–Aug and Oct–Jan; predominantly on the Agulhas Bank (Barange *et al.*, 1998). Eggs may remain inshore on the western Agulhas Bank or be transported to West coast nursery grounds	Juveniles inshore; adults migrate offshore as they mature. In winter, adults in the west coast region move inshore and southward toward the Agulhas Bank to spawn.	Form large shoals; diurnal vertical migration (near seabed by day, ascending at night to feed on zooplankton)

Species / Group	Distribution & Habitat	Spawning Areas & Seasons	Movement Patterns & Recruitment	Additional Notes
Hake (*Merluccius capensis & M. paradoxus*)	Dominant demersal species in the Benguela ecosystem. *M. capensis*: ~100–450 m depth; M. *paradoxus*: ~300–1,000 m depth (Jansen *et al.*, 2015)	Year-round serial spawners, peaks in Oct/Nov & Mar/Apr (Jansen *et al.*, 2015). *M. capensis*: Spawns on the continental shelf in SA and Namibia (notably near Cape Columbine and western Agulhas Bank); In Namibia, spawning between 25°S and 20°S peaks Jul–Sep. *M. paradoxus*: Primarily spawns between western Agulhas Bank & Elands Bay at depths 200–650 m; eggs found 340–1,500 m (Stenevik *et al.*, 2008).	Both species migrate vertically (demersal by day, mid-water at night) to feed. *M. paradoxus* migrate northward into Namibia and return south to spawn, but do not spawn in Namibian waters (Kainge *et al.*, 2007; Stenevik *et al.*, 2008; Strømme *et al.*, 2016). Eggs/larvae occur in deeper waters, reducing offshore Ekman transport (Hutchings *et al.*, 2002).	Backbone of South African and Namibian fisheries. Depth and environment influence spawning patterns.
Snoek (*Thyrsites atun*)	West & south coasts of South Africa, including the Agulhas Bank; shallow waters, coastal shelves, and depths up to 500 m, also near seamounts (Griffiths, 2002)	Spawns along the shelf break (150–400 m), mainly on the western Agulhas Bank and the west coast, from Jun–Oct (Griffiths, 2002)	Seasonal inshore migration (Apr–Jul, "snoek run") increases availability, linked to recruitment of sardine and anchovy. Eggs/larvae transported by currents to nursery areas north of Cape Columbine on the west coast and east of Danger Point on the south coast. Juveniles remain in nursery grounds until maturity.	Predators of small pelagics (sardine, anchovy), exerting top-down influence on prey and zooplankton. Targeted year-round by linefish and small-scale fishers. Also caught by demersal trawl fisheries offshore in winter (spawning season), and by tuna-pole vessels during periods of low albacore availability. West coast females move inshore to feed between spawning events, while those on the Agulhas Bank remain offshore (Griffiths, 2002).
Large Pelagic Species (Albacore/Longfin Tuna, Yellowfin, Bigeye, Swordfish, etc.)	Widely distributed in offshore waters of South Africa; species-specific thermal and spatial preferences	Albacore (Longfin): Spawn in equatorial waters >24°C (Manning, 1998). Bigeye: Spawn in east-central Atlantic, north of 5°N, and in the Gulf of Guinea during warm seasons(DFFE, 2023a). Yellowfin: Found between 10°S and 40°S in the South Atlantic; spawn in the central Atlantic near Brazil during	Albacore prefer 16–20°C waters and aggregate near Tripp Seamount (high-catch area) with peak availability late summer–early autumn (Manning, 1998). Yellowfin and Bigeye juveniles feed year-round in the Benguela; mature individuals migrate to spawning grounds in central Atlantic (Crawford *et al.*,	Albacore primarily targeted by tuna-pole fishery, Bigeye and Yellowfin key for longline fishery. Seasonal availability, weather conditions, and small pelagic prey abundance influence fisheries. Although catch volumes are relatively low off the west coast, high market value

Species / Group	Distribution & Habitat	Spawning Areas & Seasons	Movement Patterns & Recruitment	Additional Notes
		austral summer(Penney *et al.*, 1992). Swordfish: Spawn in warm tropical/subtropical waters.	1987). Swordfish move to cooler temperate zones during summer/autumn. Albacore (longfin) availability increases during the summer upwelling season.	compensates (Manning, 1998).
Southern mullet (*Chelon richardsonii*)	Endemic to southern Africa, widely distributed in nearshore marine environment, surf-zone, estuaries and lower freshwater reaches of river systems (Lamberth and Whitfield, 2013)	Spawns during austral spring and summer, with early and late summer peaks, in the nearshore or surf-zone in the Western Cape (Lamberth and Whitfield, 2013)	Juveniles found in estuarine and surf-zone nursery habitats, adults inhabit inshore marine systems, specifically sandy beach surf-zones (Horton *et al.*, 2019)	Main target species of beach-seine and gillnet fisheries on the west coast. Stock status noted as heavily depleted (DFFE, 2023a)

- Fishery sectors potentially impacted by the proposed development

Based on the 2018 fishing rights register (DEFF, 2018), fishers in Port Nolloth was allocated the following fishing rights: Hake longline, Hake handline, Hake deep-sea trawl, netfish, small pelagics, linefish, west coast rock lobster (WCRL) nearshore, WCRL commercial, and a fish processing facility. In Kleinzee, seaweed harvesting rights were allocated to rightsholders, and in Hondeklipbaai, linefish and WCRL nearshore rights were assigned to rightsholders. Additionally, there is an abalone aquaculture facility in Kleinzee. According to the draft Wild Fisheries Sector Plan, currently open for public comment, the area between Alexander Bay and Port Nolloth is zoned as II: Fisheries High Use Areas; III: Fisheries Moderate Use Areas and IV: Fisheries Limited Use Areas.

Below, Table 6-4 provides an overview of the wider fishery sectors that may be impacted by the proposed development.

Table 6-4: An overview of fishery sectors in South Africa that may be impacted by the proposed development.

Fishery / Sector	Distribution & Key Habitat	Target Species & Catch Trends	Management & Regulations	Gear & Operations	Additional Notes & References
Small Pelagic Purse Seine	Primarily along South Africa's west and south-west coasts; main landing harbours include St Helena Bay, Laaiplek, Saldanha Bay, and Hout Bay; smaller number operating from Gansbaai, Mossel Bay, and Gqeberha	Targets sardines, anchovies, and round herring (*Etrumeus whiteheadi*); ~80% of annual catch from sardines & anchovies; declining trends from 2016–2019 (down 45% in total combined catch), recovery in anchovy in 2020, but low catches persisted despite high TACs in 2021–2022; sardine considered depleted, anchovy & round herring abundant but below historical peaks (van der Lingen, 2021; DFFE, 2023) small pelagic fishery subject to environmental variability and long-term abundance shifts	Managed via Total Allowable Catches (TACs) for sardine and anchovy; round herring regulated by a Precautionary Upper Catch Limit; spatial overlap of proposed Boegoebaai harbour with support areas could reduce stock and profitability, impacting coastal communities (Hutchings *et al.*, 2002; Grüss *et al.*, 2016; DFFE, 2023a)	Purse seine vessels (~100) range from 11–48 m; fishing concentrated inshore, up to ~100 km from shore; seasonal activity patterns (e.g. anchovy-directed fishery most active Mar–Sep; round herring targeted Jan–Mar); gear and effort linked to processing facilities along coastline	Second most valuable (after demersal trawl) by volume; subject to natural fluctuations due to environmental variability; long-term changes in sardine–anchovy dominance noted locally & globally (van der Lingen *et al.*, 2001; DFFE, 2023a).
Demersal Trawl	West and south coasts; offshore sector along shelf edge at 200–1,000 m depth (most effort 300–800 m on west coast); inshore sector in shallower waters on Agulhas Bank	Targets deep-water hake (offshore sector), shallow-water hake, and Agulhas sole (inshore sector), plus bycatch: monkfish, kingklip, snoek. Generates over R5.2 billion annually (DFFE, 2023a)	Global TAC set for both hake species combined (DFFE, 2021), with 80% allocated to offshore trawl; ring fence established to limit footprint since 2005; MSC-certified with sustainability measures in place; 2024 TAC at 145,700 t hake, and precautionary limits for monkfish and kingklip	Fleet includes 61 offshore trawlers (wetfish & freezer vessels); inshore sector has 26 vessels mainly in Mossel Bay & Gqeberha; fishing done along depth contours, targeting aggregations around seamounts and canyons	Most valuable SA fishery (~half national revenue); measures to avoid further habitat expansion; supports major port economies (DFFE, 2023a)
Hake Demersal Longline	West and south-east Coasts, similar areas as demersal	Targets Cape hakes (shallow-water & deep-	Subject to same global hake TAC as trawl; spatial	Wetfish vessels (~6 days at sea) preserving catch on ice;	Contributes to total hake supply; overlaps spatially

Fishery / Sector	Distribution & Key Habitat	Target Species & Catch Trends	Management & Regulations	Gear & Operations	Additional Notes & References
	trawl but restricted from <110 m depth or <5 nm from coast	water), with kingklip as frequent bycatch; accounts for ~5–6% of annual total hake catch; most recent catches mainly on west coast (DFFE, 2021)	closures (e.g. kingklip box); ~109 rights holders, 40–50 operating vessels; compliance with depth and area restrictions (DFFE, 2021)	operates from major harbours (Cape Town, Hout Bay, Mossel Bay, Gqeberha, and smaller ports); vessels licensed under linefish effort regulations	with trawl sectors but differentiated gear and operations
Linefish	Coastal fishing mainly within 15 km of shore, extending up to 40 nm offshore for vessels certified to do so; key areas: Zone A (Port Nolloth to Cape Infanta) dominant	Targets snoek, yellowtail, Cape bream, geelbek, dusky kob, and others. Traditional linefishery is third most important fishery by tonnage and economic contribution (R105.5 million in 2022) (McGrath, 2024). Some stocks historically overexploited (DFFE, 2023a)	Regulated via Total Applied Effort (TAE) with capped vessel numbers since 2006; linefish emergency declared in 2000 due to overfishing; overlapping species targeted by multiple fisheries; 2022 FRAP allocated 281 vessels to commercial linefish & 59 to small-scale (DFFE, 2023b)	Boat-based (4.5–11 m vessels), hook & line gear; seasonal availability, with snoek and yellowtail catches varying annually; competition with other fisheries (trawl, tuna pole, beach seine) for same species	Long history (since 1500s); small-scale and commercial overlap; recent legal frameworks recognize small-scale rights; in Northern Cape, snoek is main target, plus Cape seabream, geelbek, kob, yellowtail (Isaacs, 2013; Japp and Wilkinson, 2021; McGrath, 2024)
West Coast Rock Lobster (WCRL)	Concentrated close inshore (few nautical miles) along entire west coast, from south of Alexander Bay to north of Kleinzee, including near Port Nolloth and Hondeklipbaai	High-value fishery (~R500 million/yr), important for coastal livelihoods (~4,300 jobs); currently overexploited and heavily depleted. 2023/24 TAC reduced by 16.43% to 460 tons (DFFE, 2023a)	Managed by annual TACs allocated by zones; divided into five subsectors (commercial offshore/nearshore, recreational, small-scale); closed seasons imposed by zone; WCRL is overfished and faces poaching issues (Eggers *et al.*, 2022; DFFE, 2023a)	Offshore sector uses traps at 30–100 m depth; nearshore sector uses hoop nets at 15–30 m; vessels operate from nearby harbours, mostly small-scale and close inshore	Third most valuable fishery; overlaps with proposed development areas; management aimed at stock recovery and maintaining coastal employment (Capmarine, 2017)
Tuna Pole Fishery	West coast shelf break and beyond 200 m isobath, from just south of Alexander Bay southwards; main bases: Cape Town, Hout Bay, Saldanha Bay	Targets juvenile/sub-adult albacore (longfin) tuna, with bycatch of yellowfin, bigeye, skipjack. Seasonal (Nov–May) with peak Nov–Jan. No Northern Cape rightsholders, but some fishing in area (DFFE, 2023a)	Managed under a TAE system (150 vessels for 15 years allocated in 2021/22 FRAP); must comply with RFMO measures; bag limits on yellowtail bycatch; no retention of swordfish, billfish, sharks. Historically part of linefishery until 2003 (DFFE, 2023a)	Vessels 10–20 m without freezing facilities stay up to 1 week; larger freezer vessels >3 weeks at sea; opportunistic targeting of snoek & yellowtail inshore when tuna unavailable	High-value seasonal fishery; supported by international RFMO membership; can supplement catches with other species to offset seasonal tuna availability

Fishery / Sector	Distribution & Key Habitat	Target Species & Catch Trends	Management & Regulations	Gear & Operations	Additional Notes & References
Netfish (Beach Seine & Gillnet)	West coast from Port Nolloth to False Bay, divided into 15 zones: shallow waters (<50 m depth), nearshore (surf zone for beach seining)	Targets mullet (harders), St Joseph shark, and species on 'bait list'; beach seine & gillnet historically overlapped areas targeting linefish species; Harders (*Chelon richardsonii*) and St Joseph (*Callorhynchus capensis*) main Northern Cape targets (da Silva et al., 2015; DFFE, 2023a)	Regulated by TAE system with fixed number of operators and zones; rights issued for 28 beach seine & 162 gillnet holders; gear dimensions and set times regulated (DFFE, 2023a); spatial overlap of proposed Boegoebaai harbour with support areas could reduce stock and profitability, impacting coastal communities	Beach seines: labour-intensive, pulling nets ashore. Gillnets: surface-set (for mullet) or bottom-set (for St Joseph shark), limited to specified lengths/depths	Part of small-scale fishery allocation; overlaps with other sectors. Long history dating back to mid-1600s
Small-Scale Fisheries	West & South-West coasts, mainly nearshore; motorised vessels for subtidal resources; intertidal harvesting more common on East Coast. In Northern Cape they operate small boats from the shore and do not go very far due to gear restrictions and the lack of proper jetties to launch from.	Multi-species approach (>30 species), mainly linefish, WCRL, and abalone nearshore on west and south-west coasts. Historically marginalised sector now legally recognized (Sowman and Sunde, 2021; DFFE, 2023a)	Governed by Small-Scale Fisheries Policy (2012) and MLRA amendment (2014), community-based co-management, 15-year rights granted to cooperatives; overlaps with commercial and recreational sectors; TAE/TAC shared with other fisheries (DFFE, 2023a)	Traditional artisanal methods, small boats ("bakkies"), handlines, hoop nets for WCRL; basket of species allocated based on local availability. In the Northern Cape mainly targeting WCRL nearshore and linefish such as Snoek, Cape seabream. Beachcast Kelp is also harvested.	Aims to redress historical inequalities; Northern Cape cooperatives established in Port Nolloth (Aukotowa primary cooperative) & Hondeklipbaai (Longtime Hondeklipbaai fishing cooperative) with 103 declared SSF and between 10-50 working in associated supply chain; challenges with basket allocation and integration with other sectors (Clark *et al.*, 2002; Sowman and Sunde, 2021; DFFE, 2023a).
Recreational Fishing	Coastal waters throughout South Africa; small boats and shore-based angling close inshore	Targets similar species to commercial linefish, lobsters, squid, abalone; subject to seasonal and bag-limit regulations. Data limited, often uses commercial linefishery data as a proxy	Requires permits and adherence to bag/seasonal limits; restricted by vessel certification categories	Hook and line, similar gear to commercial linefish; small vessels usually remain <15 km from shore	Non-commercial, non-profit activity widespread; important for tourism and leisure; no exact catch-effort data available (DAFF, 2016; DFFE, 2023a)

Fishery / Sector	Distribution & Key Habitat	Target Species & Catch Trends	Management & Regulations	Gear & Operations	Additional Notes & References
Aquaculture	Mainly in Western Cape, some production in Northern Cape; nearshore and onshore facilities	Produces abalone, mussels, oysters, dusky kob, yellowtail, salmonids. Total marine aquaculture output ~6,134 t in 2022; Northern Cape contributed ~70.7 t of national output (mostly from inland aquaculture (mostly African sharptooth catfish and tilapia) (DFFE, 2023a)	Subject to permits and environmental regulations; potential for job creation; expansion into abalone ranching in Northern Cape concession areas	Onshore farms (abalone, kelp), offshore mussel/oyster cultivation; hatcheries supply seed stock; kelp harvested as feed for abalone	Growing sector; SA largest abalone producer outside Asia; abalone ranching pioneered at (Britz *et al.*, 2000; Sales and Britz, 2001; Troell *et al.*, 2006; DFFE, 2023a); Port Nolloth Sea Farms pioneered abalone ranching (Capmarine, 2017).
Seaweed Harvesting	Northern & Western Cape coasts; kelp beds (*Ecklonia maxima*, *Laminaria pallida*) and red seaweed (*Gelidium* spp.); most productive areas between Doringbaai & Langebaan	Produces ~5,233 t in 2021 (DFFE, 2023a); Northern Cape MSY for 2023/24: 7,246 t whole kelp & 3,624 t kelp fronds; Boegoebaai in zone 19 with MSY of 765 t whole kelp & 383 t fronds	Allocated rights with one right-holder per seaweed type per designated area; MSY limits apply	Harvesting beach-cast & cutting fresh kelp; mainly small-scale, labour-intensive operations	~400 employed; kelp used as abalone feed, creating additional jobs; integral part of coastal economy (Troell *et al.*, 2006; Capmarine, 2017; DFFE, 2023a)

6.2.2 Coastal livelihoods[6]

The Namakwa District Municipality, running along the coastline of the Northern Cape, is the largest district in the province with the smallest population size (approximately 148 935) (StatsSA, 2022). While the Namakwa District Municipality has the lowest poverty rate (38.2% in 2022) in relation to the other district municipalities, poverty rates have increased over time across the district (Northern Cape Provincial Government, 2024). Agriculture and tourism are key economic sectors across the Namakwa District Municipality (Municipalities of South Africa, 2024); however, this differs across the three local municipalities running along the Northern Cape coastline. The local municipality of the Richtersveld is the smallest municipality in the district and the primary economic activities include agriculture, fisheries, mining and tourism (Municipalities of South Africa, 2024). While diamond mining activities played a central role in economic activities in the past of the Nama Khoi Local Municipality, tourism is now viewed as the new frontier for economic development (Municipalities of South Africa, 2024). In the Kamisberg Local Municipality, agriculture employs the highest number of people in rural communities of this local municipality (Namakwa District Municipality, 2023).

Changes in climate along the coastline of the Namakwa District Municipality are projected to negatively impact marine and terrestrial systems through variable rainfall patterns, drying trends and expected temperature increases. In particular, issues around water scarcity and quality are prevalent across this district municipality, where changes in climate are expected to exacerbate this problem through drought, reduced runoff, increased evaporation and an increase in flood events (Namakwa District Municipality, 2023). While agriculture plays a key role in local livelihoods, where small stock sheep and goat farming is the main economic activity and land use across the Namakwa District Municipality, projected changes in climate are set to negatively impact these rural communities dependent on small-scale agriculture (Namakwa District Municipality, 2023). Mining activities are also prominent drivers of change along the coastline of the Northern Cape. The mining of minerals has played a central role in the historical development in the northern part of the west coast, where alluvial diamonds are extracted from the beaches and the sea between Alexander Bay and Port Nolloth (Britz *et al.*, 2000; Municipalities of South Africa, 2024). Prospecting and mining activities for diamonds and heavy mineral sands in the ocean space off the Northern Cape take place on the coastal land, beaches, the nearshore environment and in the deep-sea (Masson, 2022).

6.2.2.1 Communities of interest

Coastal livelihoods in the four communities of interest (Alexander Bay, Port Nolloth, Kleinzee and Hondeklipbaai) are influenced by the historical development of each town, which was primarily driven by mining interests. Both Alexander Bay and Kleinzee were established as mining towns due to the discovery of diamonds in the area from the 1920s (Marais, 2023; Gadd, 2024). However, diamond mining has become less significant for coastal livelihoods over the last decade – notably due to the mine closure in Kleinzee and the greatly reduced mining activities of Alexkor in Alexander Bay (Britz *et al.*, 2000). Some smaller companies have been given concessions to mine diamonds in the area, but systemic issues linked to illegal mining and marginalisation of small-scale miners remain widespread (Masson, 2022). The port towns of Port Nolloth and Hondeklipbaai were initially founded for the export of materials such as copper ore in the mid-1800s, after which the diamond industry became a prominent feature in both towns until the 1990s. Commercial fisheries were also a prominent industry from the 1920s to the 1990s in the northern part of the west coast, where Port Nolloth and Hondeklipbaai subsequently transitioned to fishing villages between the 1920s to 1950s (Britz *et al.*, 2000; Christiansen, 2021; Namakwa-Info, 2024). However, overfishing by commercial fisheries in the 1960s and environmental changes in the late 1990s/early 2000s along the west coast altered the availability of small pelagics – resulting in the closure of many factories along the west coast (Jarre *et al.*, 2013). Both the Namaqua canning company in Hondeklipbaai and the John Ovenstone fish factory in Port Nolloth closed in the mid-1990s and early-2000s respectively, which had significant negative ramifications for coastal livelihoods dependent on fisheries (Human, 2021; Soudens, 2022).

Today, the Boegoebaai area is under mining concessions owned by Alexkor, where the area south of Alexander Bay until just south of Boegoebaai has access restrictions. There are currently no formal

[6] See Annex Report 2, pages 34-56 for the complete community profiles.

dwellings or permanent inhabitants in the Boegoebaai area and land use activities are restricted to diamond mining – where the natural harbour (known as Alexander Bay harbour) is accessed by sea and used as a shelter during winter storms by diamond boats from Port Nolloth (Local Stakeholder Interview, pers. comm.). However, according to local stakeholders, this area does hold historical and cultural significance to surrounding local communities predating the current mining activities. Local stakeholders account that there are 17 grave sites belonging to the Nama people in the Boegoebaai area, as well as scarce *Buchu* plants that hold cultural and medicinal significance to the Nama people (Nortje and van Wyk, 2019). This area also contains grave sites of early colonial settlers (1890s) that are linked to the original Rietfontein farmhouse, which predates the mining activities and subsequent restrictions (Local Stakeholder Interview, pers. comm.). Furthermore, the Boegoebaai coastal area also historically formed part of traditional fishing grounds for small-scale fishers based in the neighbouring community of Port Nolloth (M. Sowman, pers. comm.). Predating mining activities, Boegoebaai was an important traditional fishing area for WCRL (Local Stakeholder Interview, pers. comm.) – where small-scale fishers have subsequently lost road access to these fishing grounds over time due to closures linked to mining restrictions (M. Sowman, pers. comm.).

At present, the livelihoods of the four coastal communities of interest are intricately tied to marine resources (also see Table 6-5 & Table 6-6). Port Nolloth and Hondeklipbaai are traditional fishing hubs where small-scale fishers rely on linefish species and alternative activities linked to the ocean, such as kelp harvesting, to supplement livelihoods dependent on fishing through off-seasons (Local Stakeholder Interview, pers. comm.). Traditional fishers based in Port Nolloth and Hondeklipbaai are deeply connected to the sea in terms of legacy (i.e., intergenerational fishing families) and culturally, where fishing is deeply personal and central to their coastal livelihoods – reflecting not only a profession but a way of life for the communities (Local Stakeholder Interview, pers. comm.). Diamond mining activities are still present in Port Nolloth, where the harbour is used to support coastal and offshore mining operations. Meanwhile, Kleinzee has seen a transition towards aquaculture, including seaweed farming and abalone cultivation, as mining activities have declined (Local Stakeholder Interview, pers. comm.). Alexander Bay, historically dependent on diamond mining, has a mixed economic profile but retains ties to coastal livelihoods through its proximity to marine resources.

According to local stakeholders based in Alexander Bay and Port Nolloth, the social fabric and infrastructure of these two towns have eroded over time, where unemployment and associated social ills have raised concerns locally. Ocean squeeze has resulted in traditional fishing communities in Port Nolloth to increasingly lose land and sea access to their fishing grounds – where (for example) in the past, they could move their small boats (i.e., *bakkies*[7]) over land via trailer to fish north of Port Nolloth but can no longer do so as this access has been closed off due to mining restrictions (Merle Sowman pers. comm.). Other cumulative stressors on the traditional fishing communities of Port Nolloth and Hondeklipbaai include the rising cost of fuel that limits how far the fishers can travel at sea to their traditional fishing grounds; climate variability and change within the marine environment that limits days at sea; and decreases in fish stocks due to environmental and anthropogenic pressures (Merle Sowman pers. comm). The cumulative stressors of competition in the ocean space with mining and oil and gas operations continue to hamper the livelihoods of these coastal fishing communities (Christiansen, 2021). Due to water shortages due to drought over the last two years, Port Nolloth also lost most of its income from tourism. Meanwhile, tourism activities have increased in Kleinzee and Hondeklipbaai over the last few years (Local Stakeholder Interview, pers. comm.).

Key coastal livelihood activities identified for each community of interest are detailed in Table 6-5 below – see Annex Report 2 for further details. These include agriculture, fisheries, mining and tourism. While conservation was also identified as a key activity, it did not play a central role in terms of contributing directly to livelihood activities in the communities of interest, but rather linked to and supported tourism activities. Thus, wider conservation activities were discussed in relation to tourism activities taking place in the communities of interest.

[7] A traditional style of small fishing boat (i.e., two-people boats running on a motor or being rowed) with the colloquial name originating on the west coast of South Africa.

Table 6-5: Key coastal livelihood activities for each community of interest

District Municipality	Local Municipality	Community of interest	Key coastal livelihood activities	
			Primary importance	Secondary importance
Namakwa	Richtersveld	Alexander Bay	Mining	Agriculture, tourism (including conservation)
		Port Nolloth	Fisheries, mining	Tourism (including conservation)
	Nama Khoi	Kleinzee	Fisheries (aquaculture)	Mining, tourism (including conservation)
	Kamiesberg	Hondeklipbaai	Fisheries	Tourism (including conservation)

Table 6-6 below provides a summarised overview of profiles developed for each community of interest - detailing location, demographics, key features and main livelihood activities. Detailed community profiles for Alexander Bay, Port Nolloth, Kleinzee and Hondeklipbaai can be found in Annex Report 2.

1 Table 6-6: A summary of community profiles created for the four communities of interest: Alexander Bay, Port Nolloth, Kleinzee and Hondeklipbaai

Location	Population (StatsSA 2011)	Demographics (StatsSA 2011)	Key Features	Main Livelihoods	Comments on Livelihoods
Alexander Bay					
Northwesternmost town in the Northern Cape, on the Orange River bordering Namibia.	1,736	75.7% working age, 21.9% young, 2.3% elderly; predominantly Coloured (83%) and Afrikaans-speaking (90%).	Mining town with formal dwellings; erosion of infrastructure; key facilities include schools, health clinic, police station, recreational facilities (Golf Club, Tennis Courts); historical significance as a mining town founded in 1925.	Mining - Diamond mining through Alexkor.	Mining employs contractors: benefits to locals are limited.
			The town has declined in population and industrial activity due to reduced mining. Infrastructure is aging, and basic services remain stable but show signs of deterioration.	Agriculture - Richtersveld Growers operate farms.	Richtersveld Growers boost local employment and support agricultural education at the local high school.
			The Orange River Mouth is a Ramsar site and significant ecological area; potential for eco-tourism.	Tourism - Focused on Orange River Mouth.	Tourism opportunities (Ramsar wetland and unique landscape) remain underdeveloped.
Port Nolloth					
86 km south of Alexander Bay on the Northern Cape coast.	6,092	69.4% working age, 24.1% young, 6.5% elderly; predominantly Coloured (97%) and Afrikaans-speaking (88%).	Fishing, mining, and tourism hub with limited water access (piped water 78%); facilities include schools, businesses, clinics; part of Operation Phakisa's Oceans Economy program; historical importance as a copper export hub turned fishing village.	Fisheries - Small-scale fishers face challenges.	Fishing communities face restricted access to traditional grounds, rising costs, and reduced fish stocks.
			Infrastructure challenges: only one jetty operational; limited access to larger vessels due to shallow waters; declining water availability exacerbates economic and social issues.	Mining - Diamond divers and offshore vessels.	Mining provides limited employment, with a mix of local and contractor jobs.
			McDougall's Bay offers recreational activities and a Blue Flag beach, but	Tourism - Seasonal focus on flower season.	Tourism is impacted by poor infrastructure, limited water

Location	Population (StatsSA 2011)	Demographics (StatsSA 2011)	Key Features	Main Livelihoods	Comments on Livelihoods
			tourism faces hurdles from deteriorating infrastructure and unemployment.		access, and social challenges like unemployment.
Kleinzee					
62 km south of Port Nolloth.	728	86.3% working age, 12.1% young, 1.6% elderly; predominantly Coloured (61%) and Afrikaans-speaking (90%).	Former diamond mining town: all formal dwellings with high basic services (99% piped water, refuse removal); key facilities include schools, police station, and clinic; seasonal tourism focuses on birdwatching, flower season, and shipwreck trails.	Aquaculture - Abalone and oyster farming.	Aquaculture is the primary employer, including innovative practices like multi-trophic systems.
			The town's economy shifted from mining to aquaculture; Viking Aquaculture employs a large portion of residents through abalone and seaweed production.	Tourism - Seasonal activities.	Tourism focuses on birdwatching, shipwreck trails, and flower season but is constrained by water scarcity and road conditions.
Hondeklipbaai					
Coastal village, 95 km southwest of Springbok.	543	67.4% working age, 24.7% young, 7.9% elderly; predominantly Coloured (81%) and Afrikaans-speaking (97%).	Small fishing village; limited basic services (flush toilets 29%, piped water 60%); facilities include police station, clinic, and shops; historical significance as a copper export hub and fishing village.	Fisheries - Small-scale fishers.	Fishing remains central but is impacted by declining lobster stocks, limited fishing rights, and competition from Cape Town fishers.
			The cooperative model supports community development but faces challenges like funding shortages for VMS monitoring and operational costs.	Tourism - Activities include 4x4 routes.	Tourism is growing with activities like shipwreck exploration and flower season drives, but infrastructure remains a challenge.
			Agriculture in surrounding areas focuses on subsistence farming, with livestock grazing being the primary activity.	Agriculture - Subsistence farming.	Agriculture focuses on goats and sheep in surrounding rural areas but remains small-scale due to challenging environmental conditions.

1

6.2.2.2 Stakeholders of interest[8]

The proposed development represents both opportunities for alternative livelihoods and sustainable economic growth in the Namakwa District Municipality, as well as potential challenges around the representation and inclusion of marginalised communities, such as small-scale fishers, Indigenous groups, and local residents in the project development and planning process. Although project planning is supported by regulatory frameworks such as the National Environmental Management Act (NEMA) that mandates stakeholder engagement with Interested and Affected parties, these are often not robust enough in promoting equity or to safeguard the voices of marginalised stakeholders. As part of this study, we set out to understand the typology of stakeholders (direct and indirect) that could be identified. A broad spectrum of stakeholders were identified (detailed in Annex Report 1): 87 government stakeholders, 65 private enterprises, 27 civil society organisations, and 19 NGOs – each contributing to shaping the regions trajectory (see Figure 6-6 below). These identified stakeholders were linked to the four communities of interest (Alexander Bay, Port Nolloth, Kleinzee and Hondeklipbaai) through either a physical presence in these areas or through regional projects or societal affiliations. Figure 6-5 shows the percentage distribution of identified stakeholders in these communities.

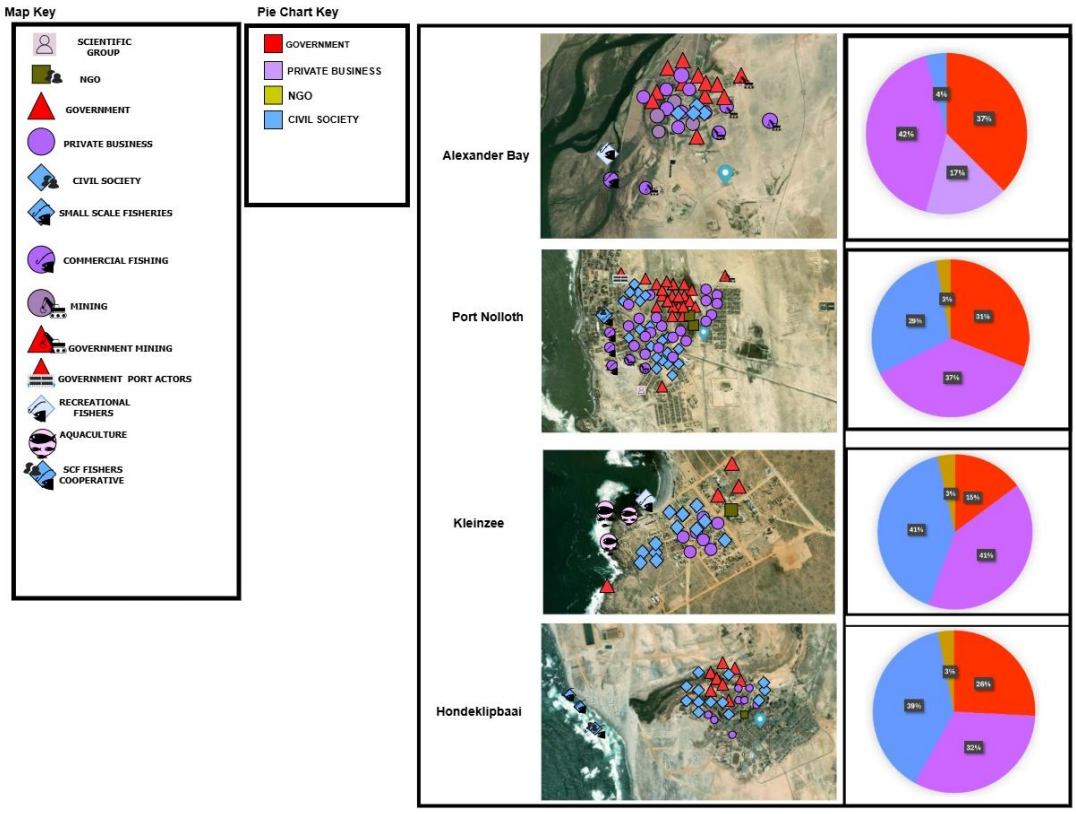

Figure 6-5: An overview of the percentage distribution of stakeholders identified in the four communities of interest: Alexander Bay, Port Nolloth, Kleinzee and Hondeklipbaai

The stakeholder analysis (see Annex Report 1) revealed that government entities represent the largest and most influential stakeholder group. Government stakeholders play a pivotal role in offering policy alignment, regulatory support, and resource allocation, with agencies such as Transnet and the Department of Forestry, Fisheries, and Environment (DFFE) playing pivotal roles. However, increasingly complicated governance systems also presents risks of bureaucratic delays due to conflicting objectives and complicated regulations, power imbalances, and the potential marginalisation of smaller stakeholders. The dominance of government actors suggests a top-down development approach, prioritising national economic goals over localised socio-environmental concerns. While this may streamline decision-making

[8] See Annex Report 1, pages 6-24 for the complete Stakeholder analysis.

and attract foreign investment, it risks sidelining the voices of communities directly impacted by the project.

The private sector, comprising industries ranging from tourism and logistics to energy and construction, emerged as the second-largest stakeholder group. Private sector involvement is expected to drive investment, innovation, and efficiency. However, this may also introduce profit-driven priorities, power disparities and short-term outlooks that could neglect long-term sustainability and conflict with equitable resource distribution required for the project to succeed holistically. Private sector dominance may also sideline marginalised groups.

Civil society and local community organisations, though numerous, are comparatively underrepresented in decision-making processes. Civil society and NGOs are essential in advocating for transparency, social justice, and environmental conservation, ensuring that community interests and marginalised voices are represented. However, it can also lead to conflicts, particularly when their interests clash with those of the government or private sector. Environmental advocacy groups have already voiced concerns about the potential displacement of coastal livelihoods and the destruction of marine ecosystems linked to the proposed Boegoebaai project. While these groups play a crucial role in holding project proponents accountable, their influence is limited compared to the dominant government and private sector stakeholders.

Small-scale fishers, who depend on the marine environment to sustain their livelihoods, potentially face the most immediate threats from the proposed Boegoebaai project. The encroachment of industrial activities on traditional fishing grounds may jeopardise both livelihoods and cultural heritage of surrounding fishing communities. Marginalised by structural inequities (Sowman and Sunde, 2021), these stakeholders lack the power to shape project outcomes, often leaving their concerns unaddressed.

When government and private sector stakeholders hold the majority representation in the Boegoebaai port development, and civil society and NGOs hold less influence, this suggests a development model driven primarily by economic and political interests rather than social or environmental considerations. This scenario reveals several critical dynamics that may influence the outcome of the proposed Boegoebaai development, with far-reaching implications for civil society – particularly fishing communities whose livelihoods may be directly impacted by the development (see Figure 6-6).

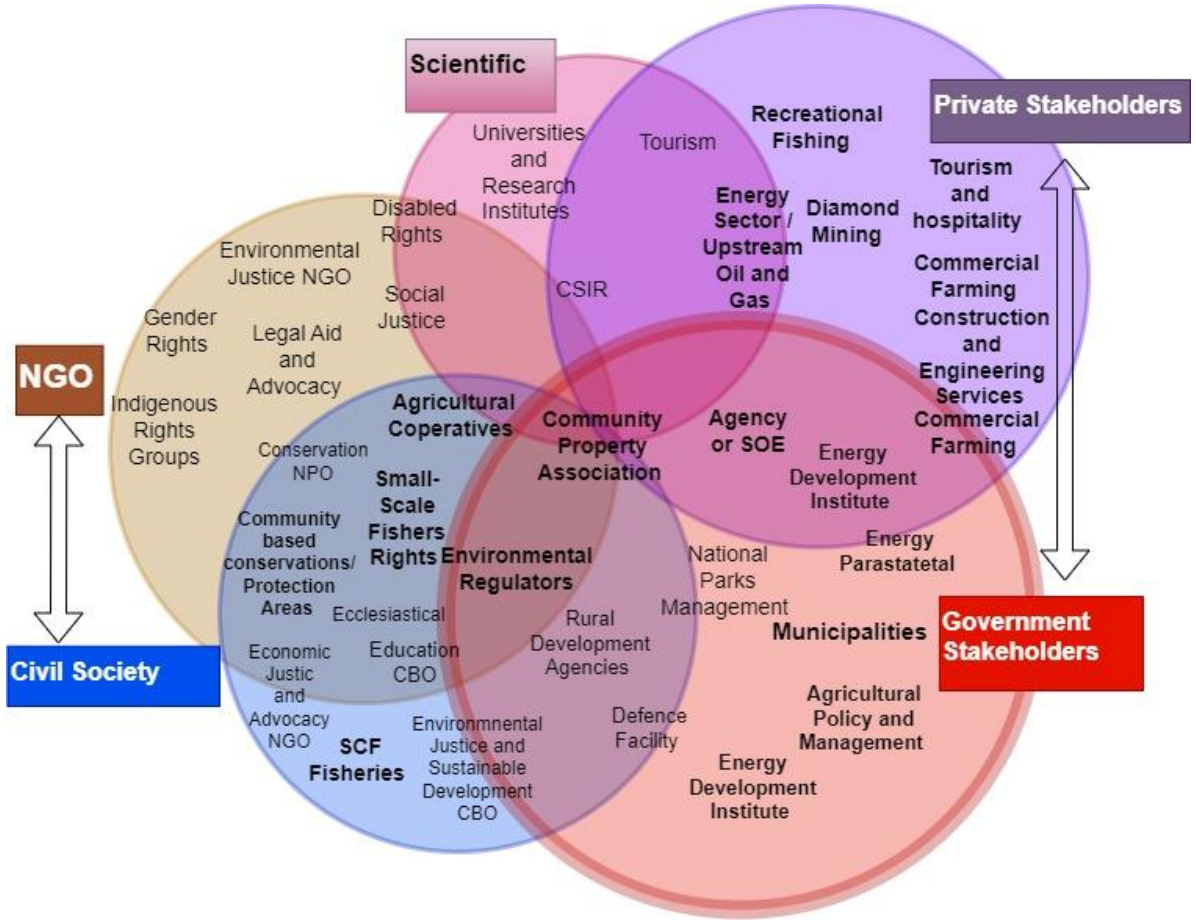

Figure 6-6: Venn Diagram illustrating overlap and interplay of various potential stakeholders related to the proposed development

Key challenges include power imbalances that may further marginalise impacted communities, while negative environmental impacts could undermine the region's ecological integrity. Conflicting stakeholder interests and potential resistance from civil society may add further complexity. However, this proposed project also presents opportunities. By prioritising inclusive meaningful engagement and addressing the concerns of marginalised groups, the initiative could foster initial community buy-in that is required for meaningful inclusive engagement, and at the same time enhance its legitimacy. Sustainable practices and equitable resource allocation would not only mitigate resistance but also align the project with global standards for socially responsible development.

6.2.2.3 Emerging Impacts and Aspects related to the proposed development

Several impacts and aspects emerge from both the stakeholder analysis (Annex Report 1) and community profiles (Annex Report 2) for each community of interest (see Table 6-7). Stakeholder analysis and interactions with key stakeholders reveal shortcomings in communication, inclusivity, and representation in earlier stakeholder processes that will impede project success if not explicitly addressed. Challenges such as fragmented communication channels, inadequate involvement of marginalised groups, and imbalanced power dynamics have eroded trust and hindered effective collaboration among stakeholders. Furthermore, the traditional absence of robust feedback mechanisms, accountability structures, and cultural sensitivity has exacerbated tensions and limited equitable participation. These insights highlight the urgent need for a strategic approach to enhance stakeholder engagement, ensuring that all voices are heard, respected, and integrated into project development and implementation.

Table 6-7: Emerging Impacts and aspects related to the proposed development emerging from stakeholder (Annex 1) and community profile (Annex 2) reports

Focus Area	Recommendation
Alexander Bay	
Socio-Economic Opportunities	Ensure equitable access to port employment opportunities, particularly for marginalised groups.
	Transition skills and infrastructure from mining to industrial activities.
Environmental and Social Impacts	Evaluate cumulative environmental impacts of mining and port activities.
	Engage conservation organisations to monitor and mitigate degradation.
Stakeholder Engagement	Facilitate multi-stakeholder dialogues.
	Provide clear communication channels for community participation.
Port Nolloth	
Fisheries and Livelihoods	Protect small-scale fishing livelihoods from industrial disruptions.
	Strengthen marine resource management to prevent overfishing and displacement.
Infrastructure and Accessibility	Ensure port infrastructure does not restrict fishing grounds or harm marine habitats.
	Develop alternative income initiatives, such as eco-tourism.
Stakeholder Engagement	Collaborate with fishing co-operatives and conservation groups to design mitigation measures.
	Create transparent platforms for fishing rights decisions.
Kleinzee	
Aquaculture and Tourism	Integrate aquaculture into environmental planning to prevent water and habitat degradation.
	Promote conservation-aligned tourism opportunities.
Resilience and Diversification	Expand aquaculture through capacity-building initiatives and financial assistance.
	Foster synergies between tourism and aquaculture to diversify the economy.
Stakeholder Engagement	Strengthen collaboration with aquaculture enterprises and tourism operators.
	Involve local businesses in long-term planning and resource discussions.
Hondeklipbaai	
Fisheries and Vulnerabilities	Maintain access to traditional fishing grounds for small-scale fishers.
	Offer skill-building for alternative livelihoods like eco-tourism and aquaculture.
Infrastructure Development	Minimise disruptions to livelihoods and cultural practices in infrastructure projects.
	Collaborate with NGOs to advocate for marginalised groups.
Stakeholder Engagement	Engage fishing communities in co-management frameworks.
	Ensure women's perspectives are included in consultations.
Cross-cutting Themes	
Inclusive Governance	Establish community advisory boards for ongoing decision participation.
	Strengthen co-management frameworks for resource management.
Environmental Stewardship	Prioritise marine spatial planning to protect habitats.
	Implement monitoring systems (that could also include citizen science monitors) to track environmental and social impacts.
Capacity Building and Advocacy	Provide financial and technical support for adapting to socio-economic changes.
	Partner with NGOs and private sector for equitable resource allocation and decision-making.
Transparent Communication	Develop culturally appropriate communication strategies. This includes ensuring that technical reports are communicated in an understandable language and using different formats. Explore innovative ways to communicate potentially complex concepts around negative and positive impacts.
	Create mechanisms for feedback and grievance redressal.

6.3 IMPACTS AND RECOMMENDATIONS

The proposed development holds the promise of economic growth and expanded infrastructure, although stakeholders and experts have voiced profound concerns for the communities whose livelihoods, cultures, and complex environments cannot simply be regarded as either terrestrial or marine, but rather as an interface of both. Four overarching, and interlinked, themes have emerged from this analysis: the potentially devastating impacts on large commercial fisheries' nursery areas; the gradual but persistent closure of operating space for small-scale fishers; the threat of gentrification[9] pressures that may undermine the socio-cultural fabric of communities adjacent to the area of interest and fractious stakeholder engagement processes that leave local communities feeling excluded and unheard. These interlinked issues underscore the importance of careful, transdisciplinary[10] development planning that places community engagement and environmental stewardship at its core. In particular, the project-specific impact assessment framework mandated by the National Environmental Management Act (NEMA) risks neglecting c cross-cutting cumulative impacts that would be devastating to local fisheries and coastal livelihoods.

We here outline the strategic direction for future ESIAs and highlight impacts, as per themes that emerged from our research. The mitigation approaches and recommendation should be regarded as being supportive of each other and as such cannot be implemented in isolation. We must underscore that these impacts are by no means exhaustive and further, directed studies with primary fieldwork and extensive stakeholder engagement are needed. Instead, this analysis provides strategic guidance, acknowledging that detailed ESIAs will be required for each project.

Here, we have drawn on both Annex reports in determining impacts and recommendations as well as key experts and established literature. The Marine Ecosystem specialist study was not available at the time of submission (December 2024), their relevant inputs will be added before finalising this report in February 2025.

6.3.1 Physical marine ecosystem impacts

Impact/Aspect: The proposed port development has the potential to negatively impact fish and invertebrate's habitat, and in turn the fisheries livelihoods by decreasing both overall catch and catch per unit effort of target species. This decline can lead to increased costs and reduced profits, resulting in negative socio-economic consequences for communities and businesses involved in fishing. This will impact businesses and communities involved in fisheries along the entire west coast, from Port Nolloth to Cape Town.

The proposed construction and ongoing operations of the port pose serious threats to marine ecosystems and fisheries. Direct mortality of target fish and invertebrate species, encompassing all life stages from eggs to adults, is a primary concern associated with harbour development. The direct impacts on the nursery grounds along the coast would severely affect the large industrial South African fisheries. Our recommendation is that a specialist fishery study is commissioned as part of the ESIA for the Boegoebaai Port development. Additionally, the destruction or degradation of critical marine habitats—such as feeding and nursery grounds, migration routes, and essential habitats for prey species—could substantially reduce the abundance of key fishery species. Notably, the proposed harbour site overlaps spatially with support areas for two of South Africa's most important fisheries, namely the small pelagic and hake fisheries (Hutchings et al., 2002; Grüss et al., 2016).

It is also important to consider that if large-scale commercial fisheries and nursery grounds are impacted by this development, the scope of who are deemed 'interested and affected parties' must be expanded to include amongst others, representatives from the Fishing Industry as well as communities along the coast

[9] Gentrification is a "process in which formerly declining, under-resourced, neighborhoods experience reinvestment and in-migration of increasingly affluent new residents, with understudied implications for individual health and health-protective community resources for low-income and minority residents" (Tulier et al., 2019, p 1).

[10] Transdisciplinary refers to approaches that integrate knowledge and methods from multiple disciplines and stakeholders to address complex real-world problems holistically. It transcends traditional academic boundaries to create innovative, comprehensive solutions.

all the way to Cape Town, including key communities such as Saldanha Bay. As part of this process, the fishing industry must be consulted as key stakeholders in the project.

Moreover, the construction activities are likely to disrupt and alter fish behaviour, interfering with annual spawning events and migration patterns. Such disturbances may lead to reduced biological fitness and a decline in lifetime reproductive output, further jeopardising fish populations. Siltation resulting from harbour construction and regular operations can cause shading or smothering of vital seaweeds, including kelp beds. This will affect local livelihoods dependent on kelp harvesting but also WCRL as the latter depend on kelp beds for recruitment. In addition, dredging activities have been shown to cause changes in marine currents and damage benthic habitats and organisms, which are a key food source for many linefish species.

Mitigation approach: Measures such as the establishment of traffic exclusion zones around the harbour could result in a reduction of productive fishing areas. While this may limit access for local fishers, these zones have the potential to create protected habitats for resident species. Such protection could lead to an increase in the biomass of spawners, potentially enhancing catches in adjacent fishing areas through a spill-over effect. However, the overall impact on fisheries depends on the balance between reduced fishing space and the benefits derived from protected habitats. Comprehensive mitigation measures are essential to address these multifaceted impacts, ensuring the sustainability of both marine ecosystems and the fisheries that depend on them. The exact mitigation approach must be explored in a specialist fisheries study that must be commissioned (see Overarching Recommendations).

Overarching Recommendations: A specialist fishery impact study must be commissioned to examine the cumulative impacts of the proposed development. This study needs to include the impact of all stages of port development, including port operation, the latter with potential impacts such as increased vessel traffic, ship discharges and emissions, cargo handling and storage (e.g., potential introduction of extrinsic pollutants, such as spilled nurdles or medicines that end up on the beaches, and hazardous materials). The impact of increased vessel traffic, resulting in increased ship discharges and emissions, spills and underwater noise, on the five Ecologically or Biologically Significant Marine Areas (EBSAs) surrounding the proposed development area also needs to be examined. These EBSAs are key in terms of their biological diversity, and support threatened species and ecosystem types (Harris *et al.*, 2022). In particular, the Orange Seamount and Canyon Complex EBSA, approximately 30 km due west off the coast is a 'hotspot of demersal fish biodiversity', the proximity of this EBSA to the development area is concerning and should be carefully considered.

The study should be commissioned in a way that it can be referenced in all the different environmental impact assessments conducted for the various stages of the project and consider the impacts of port development from water quality and coastal hydrology to socio-cultural impacts (United Nations, 1992). For instance, changes in local hydrodynamics due to the port construction and dredging should be accounted for by conducting modelling studies that can advise on the best design for developing port infrastructure and minimise potential impacts. Similarly, particle tracking simulations should be performed to evaluate the potential trajectories of oil spills, chemical and other potential pollutants (e.g. nurdles) on the coastal and marine ecosystem. The impacts of climate change also need to be considered. Climate change is expected to increase sea level rise and the frequency and intensity of extreme events (Seneviratne *et al.*, 2023), which will directly impact port infrastructure but can also increase cargo loss at sea. Pollution due to cargo spills (e.g., nurdles) has been shown to have profound negative impacts on coastal and marine ecosystems (de Vos *et al.*, 2022).

We make specific recommendations related to the consequences for fisheries from the physical environmental impacts of the proposed development, which are outlined in Table 6-8.

Table 6-8: Specific recommendations related to consequences for fisheries from physical environmental impacts

Aspect	Impact	Benefit	Potential Negative Impact	Recommendation	Scale of Impact
Fisheries	Habitat destruction affects nursery grounds and migration routes.	-	Long-term fish population reduction impacts fisheries.	Conduct fisheries-specific EIAs and co-design mitigation measures.	Regional, National
	Construction and operations lead to direct mortality or sublethal damage of target fish species.	-	Disruption of fish behaviour, spawning, and migration patterns reduces reproductive success.	Create protected zones to minimize operational impacts and enhance fish stock resilience.	Regional, National
Siltation	Marine vegetation smothered, affecting biodiversity and livelihoods (e.g., kelp beds, seaweed harvesting).	-	Degradation of habitats essential for species survival and marine biodiversity.	Monitor impacts and rehabilitate marine ecosystems.	Local, Regional
Pollution	Water quality declines due to dredging and operations.	Enhances regulatory frameworks for pollution control.	Ecosystem health deteriorates, affecting fisheries and biodiversity.	Enforce strict monitoring of discharges and maintain water quality standards.	Regional, National
Exclusion Zones	Traditional fishing activities restricted by exclusion zones around port.	Potential creation of de facto marine protected areas, enhancing biodiversity.	Reduced space for traditional fishers impacts livelihoods and socio-economic stability.	Incorporate exclusion zones into marine spatial planning to balance industrial and fisheries needs. Work with the community to establish OMPs for these new "de facto" protected areas, planning both temporally and spatially for how these changes could be allocated to the benefit of the local community.	Local, Regional

6.3.2 *Consequences of ocean squeeze*

Impact/Aspect: A key theme highlighted throughout this report is the cumulative pressures playing out in the sea space that is significantly impacting local coastal communities and their respective livelihoods, particularly in relation to small-scale fisheries. This "slow" ocean squeeze on traditional fishers and the associated adverse environmental impacts on coastal and marine ecosystems should be taken into serious consideration when planning future activities that impact the Namaqualand coastline. The systemic erosion of socio-cultural values, traditions and access of local fishing communities linked to the sea and associated environmental degradation of coastal and marine ecosystems due to historical and current mining and oil and gas activities, should be a main concern when planning blue economy activities – which need to consider blue justice and just transitions to sustainable livelihoods for local communities (e.g. Sowman and Sunde, 2021). Furthermore, the interlinked nature of the ocean space in terms of impacts on sensitive marine habitats that have much wider regional and transboundary implications for both the ocean and socio-economic dependencies is very important to consider when planning ocean-

based activities, particularly under the current regime of global climate change and currently uncertain-yet-anticipated impacts.

Our work has shown that fisheries and coastal communities are at risk of negative impacts, especially from phenomena like ocean squeeze, where the seaward-facing side of the coast is becoming increasingly competitive with fishers' operating space already greatly diminished. The proposed development poses a high risk for further closing down of available space leading to less space to fish and more competition for space and resources leaving their ability to sustain livelihoods severely negatively impacted. It is also critical to acknowledge that the future impact of resource scarcity (fish) and the looming threat of climate change will exacerbate the impact of ocean squeeze, underscoring the need to consider how we can build resilient communities that are prepared for the future.

Mitigation approach: To address issues around ocean squeeze, it is necessary to consider and manage cumulative impacts across the various projects that is associated with the proposed development. Mechanisms for cross-cutting project planning and meaningful community engagement must be explored. Accurate measurement of cumulative effects is essential for assessing the short and long-term impacts of proposed developments. Unlike infrastructure projects with straightforward physical impacts, such as relocating a port or altering a jetty's location, the introduction of new developments into a social-ecological system affects system dynamics in complex ways. These must be carefully understood at the small and large scale before any mitigation measure is suggested.

Recommendations: Comprehensive spatial and cumulative impact assessments must underpin all planning processes and must be explicitly included in the specialist fisheries study and cross-cutting ESIAs related to the development. Meaningful, equitable and collaborative engagements are required with commercial, small-scale and traditional fishers to integrate their perspectives into decision-making and using advanced modelling tools to predict and manage potential conflicts over resource use (also see section 3.4). Additionally, an explicit analysis of how infrastructure and vessels related to this development will interact with other marine industries such as the various mining concessions granted in the area in the context of a marine spatial plan for the area. This analysis is crucial to understanding the ultimate consequences for fisheries and coastal livelihoods beyond the scope of the study.

Table 6-9 outlines specific recommendations related to the consequences of ocean squeeze for small-scale fishing communities in the area of interest.

Table 6-9: Specific recommendations related to consequences of ocean squeeze for (particularly) small-scale fishers

Aspect	Impact	Benefit	Potential negative impact	Recommendation	Scale of Impact
Cumulative Pressures on Fisheries	Increased competition and space limitations for traditional fishers due to industrial expansion and exclusion zones lead to loss of livelihoods	-	Reduced fishing areas exacerbate socio-economic vulnerabilities for small-scale fishers including loss of livelihoods.	Implement (co-managed) marine spatial planning that recognises and integrates traditional fisheries. The first step would be for potential developments to support government to support, capacitate and resource existing Coastal Management Committees to function effectively. Facilitate dialogues marine stakeholders (including fishers) to balance interests and mitigate conflicts. Improve engagement	Regional, National

Aspect	Impact	Benefit	Potential negative impact	Recommendation	Scale of Impact
				with fisheries in project planning processes to ensure that livelihood activities are preserved. Introduce adaptive fishing practices and diversified livelihood options to build resilience to environmental and economic pressures.	
	Socio-cultural values and traditional fishing activities further erode under cumulative pressures (e.g., mining, oil and gas, port activities).	Promotes collaboration on just transitions and blue justice principles for local communities.	Loss of cultural heritage linked to fisheries and marine resource access.	Develop co-management frameworks to ensure cultural practices are protected and integrated into planning.	Local, Regional
	Resource competition driven by overlapping marine activities limits access to critical fishing areas.	-	Conflict between industrial users (e.g., mining and port activities) and traditional fishers may escalate.	Establish stakeholder dialogue platforms to resolve conflicts and align resource access priorities. Use GIS mapping to identify overlapping concessions and assess their impact on small-scale fishers. Develop marine zoning plans that prioritise access for traditional fishing communities. Create community-led monitoring initiatives to track spatial use changes and their impacts on fisheries. Establish feedback loops to refine zoning and management practices based on observations	Regional, National

6.3.3 Gentrification pressures

Impact/Aspect: The primary coastal livelihoods in the communities of interest near the proposed Boegoebaai development include agriculture, fishing, mining, and tourism (linked to conservation). While the building of infrastructure around the proposed SEZ may lead to the growth of secondary economic activities and possibly increase job opportunities, it could also have negative impacts on existing livelihoods and communities. Economic development of an area, without the concomitant growth of skills, capacities and opportunities for the resident population, could result in gentrification of the existing

settlements, thereby squeezing and potentially fragmenting communities. Should skilled, long-term labour be outsourced, it will likely then be these employees and newcomers to the area that will benefit the most from new flows of capital and become the focus of the new markets. Further, the squeeze on available ocean and coastal space (discussed in Section 3.2) may further constrain movement and activity of those who are dependent on coastal and ocean spaces for activities that sustain livelihoods, cultural practices and well-being (e.g. Van Zyl, 2009; Williams, 2021). Any development or new streams of income must maintain the established spaces and routes of movement for the resident community, as well as maintain this community as the focus for new service provision, housing expansion and job creation. This must be done to ensure that any benefits accrue directly to them and not be left to the idea of "trickle down" economics to benefit them indirectly and inconsistently.

The proposed development could affect existing coastal livelihoods in multiple, interrelated ways. Ecologically sensitive marine ecosystems may be disrupted, threatening key species such as WCRL and snoek, and diminishing the viability of downstream small-scale fisheries. Overlapping land use could limit available grazing land for local farmers, while continued restrictions on access to the Boegoebaai area risk perpetuating a legacy of land dispossession for the Richtersveld community. Although improved infrastructure may enhance market access and strengthen economic opportunities in agriculture, livestock, and resource extraction, the actual benefits depend on how goods are transported and whether they extend beyond energy-related industries. Additionally, an influx of newcomers drawn by employment prospects could boost local housing markets and service providers, but if skills development and local sourcing are neglected, local communities may be marginalised, facing rising costs for housing and services and potential displacement. Tourism might also experience both gains and losses: while greater accessibility could spur hospitality and retail growth, environmentally sensitive areas like the lichen fields near Alexander Bay may be harmed, undermining the region's long-term tourism appeal. The impact of these pressures on the socio-cultural fabric of these communities must not be overlooked, with a real risk of irreversibly transforming the nature of the community.

Mitigation approach: Focus on protecting traditional coastal access, strengthening local skill sets, integrating affordable housing solutions, preserving cultural heritage, and safeguarding sensitive marine ecosystems. This includes creating protected zones for traditional livelihoods, fostering local capacity-building initiatives, securing land rights for indigenous and local populations, and ensuring that infrastructure and tourism developments adhere to ecological standards. Through inclusive community engagement and participatory planning, decision-making processes will incorporate local voices, uphold socio-cultural integrity, and maintain equitable access to resources, ensuring that ongoing economic growth aligns with the long-term interests of coastal communities.

Recommendations: Explore how to establish transparent governance frameworks within the scope of cross-cutting planning processes. These frameworks must prioritise community well-being, designing benefit-sharing mechanisms that reinvest economic gains into local education, healthcare, and infrastructure, and promote sustainable, eco-friendly activities that preserve cultural landscapes and marine habitats. Here, the implementation of long-term, people-centred policies and practices that value local knowledge, protect resource rights, and guide development agendas towards inclusive and environmentally responsible outcomes must be prioritised (also see Section 3.4).

Table 6-10 outlines specific recommendations related to gentrification pressures potentially stemming from the proposed development in the communities of interest.

Table 6-10: Specific recommendations related to gentrification pressures on local communities in the area of interest

Aspect	Impact	Benefit	Potential Negative Impacts	Recommendation	Scale of Impact
Infrastructure Development	Increased tourism and new employment opportunities may attract external investors and newcomers.	Potential boost for local businesses (hospitality, retail, crafts) if integrated with existing communities.	Without inclusive development, local traditions and vulnerable ecosystems may be overlooked, reducing the long-term viability of tourism and limiting local benefit.	Preserve ecologically sensitive areas and promote sustainable tourism strategies that integrate local cultural identity. Ensure training and hiring prioritise local residents, preventing external labour displacement.	Local, Regional
Equitable Housing Policies	Enhanced demand for housing due to economic growth can push property prices and rental costs beyond the reach of long-term residents.	Stabilised and affordable housing can maintain community cohesion and ensure locals benefit from development. Increased property values can benefit existing property owners.	Gentrification – increasing pressure on existing residents (especially in related to rising costs) can force people to sell and move eroding social networks and cultural heritage.	Implement rent stabilisation, accessible housing schemes, and policies prioritising local residents in new developments to mitigate gentrification pressure on housing. Encourage and capacitate community participation in housing decisions to maintain socio-cultural integrity.	Local, Regional
Market Access	Improved infrastructure can enhance access to wider markets for locally produced goods.	Greater economic viability for small-scale producers and coastal livelihoods if inclusion is ensured.	Large-scale industry interests may sideline small local businesses, reducing their market share and weakening community resilience.	Design SEZ infrastructure with local economic participation requirements, including training and capacity-building for local producers. Provide direct support to small businesses to prevent marginalisation.	Regional, National
Community Identity	Influx of newcomers may dilute local traditions, practices, and socio-cultural identity.	Inclusive growth can foster cultural exchange and economic integration if managed responsibly.	Marginalisation occurs if new opportunities primarily benefit outsiders, causing loss of cultural practices and community cohesion.	Conduct comprehensive assessments of cultural traditions, integrate these into spatial planning, and ensure decision-making processes involve local voices. Preserve cultural assets through heritage programmes and community-led planning.	Local, Regional
Coastal Livelihoods	Overlapping SEZ development can restrict access to traditional coastal and grazing lands.	Improved infrastructure could broaden economic opportunities if local needs are prioritised. Additional fresh water supply required for the towns and municipalities should the development go ahead presents an opportunity for alternative and supplementary	Loss of access undermines traditional practices (e.g., fishing, small-scale farming), leading to reduced incomes and cultural erosion.	Include local farmers and fishers in SEZ planning, secure alternative grazing and fishing areas, and maintain coastal routes for traditional activities. Employ environmental measures to protect marine ecosystems and sustain long-term livelihoods. Consider viable alternative coastal livelihood activities (such as	Local

Aspect	Impact	Benefit	Potential Negative Impacts	Recommendation	Scale of Impact
		livelihoods activities that such as on-land freshwater aquaculture.		aquaculture) in the project planning process.	

6.3.4 *Communities as collaborators*

Impact/Aspect: Effective and equitable development planning in complex social-ecological contexts requires a transdisciplinary development planning[11] approach that engages communities as active collaborators rather than passive recipients. Early, proactive, and responsive participation ensures that decision-making processes incorporate local priorities and knowledge systems, rather than imposing top-down interventions that risk overlooking or ignoring underlying social and environmental challenges. This approach is particularly relevant for marginalised groups - such as fishing, agricultural, and mining communities - whose livelihoods and cultural practices depend on equitable resource access and long-term sustainability. Importantly, it is crucial for building equitable, resilient communities[12].

Mitigation approach: We advocate for an approach that goes beyond the reactive stakeholder engagement process mandated by ESIAs to consider communities as collaborators. Communities should be included from the project design stage, where their needs must be specifically incorporated in planning processes. It is important to recognise that community needs differ, and there is no one-size-fits-all approach. Nuanced strategies must be introduced into the development planning process to ensure flexibility and reflection in project design, planning and execution. This collaborative process should begin at the scoping stage. By integrating local perspectives, diverse knowledge systems, and priorities from the outset, decision-making becomes more inclusive, context-appropriate, and resilient to socio-environmental uncertainties. Embedding meaningful community engagement early on also enables project planning to more effectively balance economic, social, and environmental objectives.

Practical measures include taking a transdisciplinary development planning approach by establishing multi-stakeholder platforms that bring together government agencies, private sector partners, civil society organisations, and local communities. These forums facilitate ongoing dialogue, transparent decision-making, and shared accountability mechanisms, ensuring that resource allocation and benefit distribution are both equitable and well-founded. Additionally, grievance redressal systems, capacity-building programmes, and inclusive environmental monitoring frameworks can prevent conflicts, incorporate local expertise, and strengthen trust. In practice, this type of transdisciplinary development planning involves acknowledging and integrating traditional and indigenous knowledge into project strategies from the

[11] Transdisciplinary development planning is a collaborative approach to planning that transcends traditional disciplinary silos by engaging directly with societal stakeholders in knowledge co-production to address complex, multi-dimensional development challenges in an integrated, holistic manner.(Toomey *et al.*, 2015; Craps, 2020)

[12] Resilient and empowered coastal community communities are characterised by inclusive, adaptive governance where diverse local actors participate in decision-making processes and influence outcomes ((Jentoft and Chuenpagdee, 2009; Bennett *et al.*, 2019). Livelihoods are diversified and not overly reliant on extractive resource use, supporting economic resilience through complementary activities such as small-scale aquaculture, ecotourism, and value-added production (Allison and Ellis, 2001; Blythe *et al.*, 2020). Social cohesion, traditional knowledge systems, and strong local institutions foster collective action and shared stewardship of marine and coastal ecosystems (Adger, 2003; Ostrom, 2009).

Empowerment in these communities extends beyond access to resources and includes political voice, tenure security, and the ability to shape the terms of engagement with state and market actors (Coulthard *et al.*, 2011). Communities are actively involved in ecosystem-based management and restoration, such as through locally managed marine areas and co-management frameworks that blend scientific and local knowledge (Olsson *et al.*, 2004; Gutiérrez *et al.*, 2011). Infrastructure and risk preparedness are designed with long-term climate risks in mind, supported by early warning systems, disaster plans, and social protection (Levine *et al.*, 2012). In essence, resilient and empowered coastal communities do not merely cope with change—they shape it, through agency, learning, and collective action.

outset, thereby enhancing cultural relevance and resilience(Lang *et al.*, 2012; Norström *et al.*, 2020). Tailored engagement with different stakeholder groups – whether supportive, uncertain, or oppositional – can pre-empt misunderstandings and disputes. Frequent monitoring, coupled with adaptive management, ensures that stakeholder perspectives continually inform the project's direction.

An integrated approach leads to more equitable, effective, and sustainable outcomes.

Recommendations: Creating a sustainable and inclusive project framework requires a comprehensive approach to stakeholder engagement. By viewing communities as genuine partners throughout planning and implementation, local buy-in and ensuing collaborative engagement is enhanced, benefits are distributed more fairly, and development pathways become more enduring and appropriate to the specific social-ecological context. We suggest, in Table 6-11 key strategies and specific recommendations related to fostering meaningful collaboration within the communities of interest. This is to ensure a stakeholder engagement process that ensures that all voices are heard and respected, fostering collaboration and trust while achieving meaningful outcomes.

Table 6-11: Specific recommendations related to fostering meaningful collaboration with communities.

Aspect	Impact	Benefit	Recommendation	Scale of Impact
Limited representation of marginalised groups in stakeholder Engagement	Marginalised communities are disproportionately negatively impacted.	Strengthens democratic processes through inclusivity.	Establish multi-stakeholder platforms such as community advisory councils to co-design, consult with and monitor projects; ensuring these bodies are structured to support shared authority, mutual accountability, and recognition of diverse knowledge systems.	Local, Regional
Miscommunication and mistrust among stakeholders due to lack of transparency	Mistrust leads to resistance and dissatisfaction.	Clear, accessible communication builds trust and ensures inclusivity.	Use public forums, newsletters, and translated materials for effective engagement, ensuring materials are accessible, culturally relevant, and delivered through trusted communication channels that support broad understanding and participation.	Local, Regional, National
Stakeholder rights unprotected without legal support (need for legal advocacy).	Vulnerable & marginalised stakeholders remain exploited.	Equitable treatment through advocacy and legal safeguards.	Provide pro bono legal services, training, and collaboration with NGOs to strengthen community agency, build legal literacy, and ensure that marginalised groups can access representation, assert their rights, and participate fully in regulatory and governance processes.	Local, Regional
Requirement for cultural sensitivity as a	Cultural misunderstandings	Aligning project strategies with	Conduct cultural impact assessments	Local,

Aspect	Impact	Benefit	Recommendation	Scale of Impact
there is a lack of respect for local customs and practices.	create tensions and resistance.	community values enhances trust.	and integrate traditional decision-making processes to ensure proposed development respects spiritual, cultural and historical values whilst aligning with existing governance structures that reflect Indigenous and local worldviews.	Regional
Lack of grievance mechanisms undermines project legitimacy and accountability.	Stakeholder dissatisfaction grows due to unaddressed concerns.	Transparency and clear accountability mechanisms build stakeholder trust.	Establish independent monitoring committees and third-party mediators for conflict resolution to ensure neutrality, transparency, and accountability in addressing disputes, while respecting local conflict resolution practices.	Local, Regional
Need to establish long-term partnerships as short-term engagement erodes stakeholder confidence	Lack of sustained dialogue weakens community trust	Ongoing collaboration supports project sustainability beyond its duration.	Develop resilience programs and maintain continuous dialogue post-project completion. This can be done by institutionalising long-term support mechanisms that address social, environmental and economic vulnerability, and ensuring that communities remain engaged in adaptive governance processes.	Local, Regional
Marginalised groups remain unheard without effective intermediaries (requirement for bridging stakeholders)	Partnering with bridging organizations fosters inclusive participation.	Gaps between powerful and underrepresented groups persist.	Leverage bridging organisations to mediate disputes and amplify marginalised voices, drawing on their capacity to connect communities with decision-makers, translate across knowledge systems, and support inclusive governance structures	Local, Regional, National
Emerging stakeholder concerns are ignored without effective feedback mechanisms without clear and continuous feedback	Regular feedback ensures responsiveness to stakeholder needs.	Ignoring concerns reduces trust and satisfaction among stakeholders.	Conduct periodic surveys, focus groups and adapt plans based on ongoing feedback, ensuring that development remains responsive to emerging needs, values and concerns through cyclical and participatory learning	Local, Regional

Aspect	Impact	Benefit	Recommendation	Scale of Impact
			mechanisms.	
Lack of clear accountability mechanisms undermines stakeholder trust	Transparent governance ensures equitable resource allocation and project support.	Unaddressed accountability concerns erode confidence in project outcomes.	Introduce public reporting, community-led monitoring, and independent audits of governmental and private actions to foster transparency, enhance credibility, and institutionalise accountability through participatory oversight structures.	Local, Regional

6.4 SUMMARY

The proposed Boegoebaai Port and SEZ development represents both an economic opportunity for South Africa's Northern Cape and a critical test of how to achieve truly equitable and sustainable marine and coastal development. Although the initiative aligns with national efforts to facilitate a just energy transition, it also highlights the complexities of balancing economic growth with the preservation of (marine) ecosystems, cultural integrity, and the livelihoods of local communities. The interplay between ecological conservation, socio-economic equity, and cultural heritage preservation emerges as central to the project's long-term success.

While the proposed development offers potential benefits, it also introduces notable potential negative impacts, particularly for often marginalised and vulnerable groups such as small-scale fishers. Disruptions to traditional livelihoods, habitat degradation, and the intensification of competition for marine resources pose serious challenges to this group. These negative impacts are amplified by existing governance gaps caused by complicated marine legislative framework that gives rise to implementation gaps and a tendency for ESIAs to focus narrowly on individual projects rather than adopting a holistic, cumulative perspective that examines cross-cutting impacts and social-ecological system interactions. Aligning the requirements for stakeholder engagement in ESIAs as mandated by various regulatory frameworks are essential, as is the need to move beyond minimum legal standards and address the cumulative, system-wide implications of large-scale infrastructure projects.

To navigate these challenges, the development requires an integrated governance framework that harmonises national objectives with local priorities. This requires ensuring that those directly affected by the project have a meaningful voice throughout planning and decision-making processes, including the incorporation of Indigenous knowledge and the protection of cultural traditions. Interventions such as co-management arrangements, habitat restoration initiatives, and support for alternative and supplementary livelihoods can help mitigate negative outcomes while strengthening resilience. Equally important is the establishment of transparent and inclusive engagement mechanisms that build trust and capacity, address power imbalances, and reinforce the project's legitimacy.

Moving forward, the proposed development must ensure that efforts to promote economic growth are matched by robust measures to safeguard environmental integrity, social cohesion, and cultural continuity. By adopting holistic planning strategies, closing governance gaps, and embedding equity into all aspects of environmental and social assessment, the project can serve as a benchmark for sustainable marine and coastal development. This approach is vital to achieving just outcomes and ensuring that the benefits of the Boegoebaai development are both enduring and equitably shared.

6.5 REFERENCES

Adger, W. N. 2003. Social Capital, Collective Action, and Adaptation to Climate Change. Economic Geography, 79: 387–404.

Allison, E. H., and Ellis, F. 2001. The livelihoods approach and management of small-scale fisheries. Marine Policy, 25: 377–388.

Allison, E. H., Adger, W. N., Badjeck, M. C., Brown, K., Conway, D., Dulvy, N. K., Halls, A., *et al.* 2005. Effects of climate change on the sustainability of capture and enhancement fisheries important to the poor: analysis of the vulnerability and adaptability of fisherfolk living in poverty. Final Technical Report. Marine Resources Assessment Group, London, UK.

Baker, E., Gaill, F., Karageorgis, A. P., Lamarche, G., Narayanaswamy, B., Parr, J., Raharimananirina, C., *et al.* 2016. Offshore Mining Industries. *In* The United Nations (UN) integrated marine assessment. United Nations.

Barange, M., Pillar, S. C., and Hampton, I. 1998. Distribution patterns, stock size and life-history strategies of Cape horse mackerel *Trachurus trachurus capensis*, based on bottom trawl and acoustic surveys. South African Journal of Marine Science, 19: 433–447. Taylor & Francis.

Berkes, F., and Folke, Carl. 1998. Linking Social and Ecological Systems: Management Practices and Social mechanisms for building resilience. Cambridge University Press.

Berkes, F. 2017. Environmental governance for the Anthropocene? Social-ecological systems, resilience, and collaborative learning. Sustainability, 9.

Blamey, L. K., Shannon, L. J., Bolton, J. J., Crawford, R. J. M., Dufois, F., Evers-King, H., Griffiths, C. L., *et al.* 2015. Ecosystem change in the southern Benguela and the underlying processes. Journal of Marine Systems, 144: 9–29.

Blythe, J., Armitage, D., Alonso, G., Campbell, D., Esteves Dias, A. C., Epstein, G., Marschke, M., *et al.* 2020. Frontiers in coastal well-being and ecosystem services research: A systematic review. Ocean and Coastal Management, 185: 105028. Elsevier Ltd.

Bouamrane, M., Spierenburg, M., Agrawal, A., Boureima, A., Cormier-Salem, M. C., Etienne, M., Le Page, C., *et al.* 2016. Stakeholder engagement and biodiversity conservation challenges in social-ecological systems: some insights from biosphere reserves in Western Africa and France. Ecology and Society, 21. Resilience Alliance.

Brick, K., and Hasson, R. 2016. Valuing the socio-economic contribution of fisheries and other marine uses in South Africa. Cape Town: University of Cape Town.

Britz, P., Sauer, W., Mather, D., and Philips, L. 2000. Towards equity, sustainability and stability: a sector planning approach to fishing and mariculture development in the Northern Cape Province, South Africa. *In* Proceedings of the Tenth Biennial Conference of the International Institute of Fisheries Economics and Trade. Oregon, USA.

Capmarine. 2017. Spatial distribution of West Coast fisheries in relation to Alexkor's marine mining concession areas. Capricorn Marine Environmental (Pty) Ltd. https://sahris.sahra.org.za/sites/default/files/additionaldocs/Appendix2_4_Fisheries_Spatial_Distribution.pdf (Accessed 7 October 2024).

Cash, D. W., Adger, W. N., Berkes, F., Garden, P., Lebel, L., Pritchard, L., Young, O., *et al.* 2006. Scale and Cross-Scale Dynamics: Governance and Information in a Multilevel World. Ecology and Society, 11: 8.

Christiansen, B. 2021, October 13. The slow squeeze on Port Nolloth's fishermen — walled in and fenced out by mining. https://www.dailymaverick.co.za/article/2021-10-13-the-slow-squeeze-on-port-nolloths-fishermen-walled-in-and-fenced-out-by-mining/ (Accessed 24 August 2024).

Clark, B. M., Hauck, M., Harris, J. M., Salo, K., and Russell, E. 2002. Identification of subsistence fishers, fishing areas, resource use and activities along the South African coast. African Journal of Marine Science, 24: 425–437.

Coetzee, J. C., de Moor, C. L., and Butterworth, D. S. 2019. A summary of the South African sardine (and anchovy) fishery. MARAM/IWS/2019/Sardine/BG1. University of Cape Town, Rondebosch. https://open.uct.ac.za/server/api/core/bitstreams/1373fadb-9d9c-4e33-92e3-d026f94e8fa6/content.

Coulthard, S., Johnson, D., and McGregor, J. A. 2011. Poverty, sustainability and human wellbeing: A social wellbeing approach to the global fisheries crisis. Global Environmental Change, 21: 453–463.

Cox, M., Villamayor-Tomas, S., Epstein, G., Evans, L., Ban, N. C., Fleischman, F., Nenadovic, M., *et al.* 2016. Synthesizing theories of natural resource management and governance. Global Environmental Change, 39: 45–56. Elsevier Ltd.

Craps, M. 2020. Transdisciplinary Processes for Sustainable Development. *In* Encyclopedia of Sustainability in Higher Education, pp. 1–9. Ed. by W. Leal Filho. Springer International Publishing, Cham. https://doi.org/10.1007/978-3-319-63951-2_102-1.

Crawford, R., Shannon, L., and Pollock, D. 1987. The Benguela ecosystem. Part IV: the major fish and invertebrate resources. Oceanogr. Mar. Biol. Ann. Rev.: 353–505.

Cvitanovic, C., Hobday, A. J., Kerkhoff, L. V., Wilson, S. K., Dobbs, K., and Marshall, N. 2015. Improving knowledge exchange among scientists and decision-makers to facilitate the adaptive governance of marine resources: A review of knowledge and research needs. Ocean & Coastal Management, 112: 25–35.

DAFF. 2012. Policy for the small-scale fisheries sector in South Africa. 474.

DAFF. 2016. Status of the South African Marine Fishery Resources 2016. Pretoria, South Africa.

Daily, G. 1997. Nature's Services: Societal Dependence on Natural Ecosystems. Island Press, Washington D.C. 392 pp.

de Vos, A., Aluwihare, L., Youngs, S., Di Benedetto, M. H., Ward, C. P., Michel, A. P. M., Colson, B. C., *et al.* 2022. The M/V X-Press pearl nurdle spill: contamination of burnt plastic and unburnt nurdles along Sri Lanka's beaches. ACS Environmental Au, 2: 128–135. American Chemical Society.

DEFF. 2018. Fishing Rights Register for all Commercial Fishing Sectors. https://www.dalrrd.gov.za/Branches/Fisheries-Management/-Fishing-Rights-Allocation-Process-FRAP 20 October 2021.

DFFE. 2021. National Framework for Marine Spatial Planning in South Africa. Department of Forestry, Fisheries and the Environment, Cape Town, South Africa. https://www.dffe.gov.za/sites/default/files/docs/strategy.framework/oceans/marinespatialplanning_nationalframework2021.pdf.

DFFE. 2023a. Status of the South African Marine Fishery Resources 2023. Department of Forestry, Fisheries and the Environment. https://api.odp.saeon.ac.za/catalog/SAEON/go/10.15493/DFFE.10000006 (Accessed 12 October 2024).

DFFE. 2023b. General published reasons for decisions on appeal: Traditional Linefish sector Fishing Right Allocation Process 2021/2022.

Dorrington, R. A., Lombard, A. T., Bornman, T., Adams, J. B., Cawthra, H. C., Deyzel, S., Goschen, W. S., *et al.* 2018. Working together for our oceans: a Marine Spatial Plan for Algoa Bay, South Africa. South African Journal of Science, 114: 1–6.

Duggan, G. L., Jarre, A., and Murray, G. 2020. Alternative Seafood Marketing in a Small-Scale Fishery: Barriers and Opportunities in South Africa's Southern Cape Commercial Linefishery. Maritime Studies, 19: 193–205. Maritime Studies.

Eggers, J., Cochrane, K., and Sauer, W. 2022. Estimating the economic income and social contributions derived from the South African west coast rock lobster fishery. African Journal of Marine Science, 44: 255–269.

FAO. 2014. Voluntary guidelines for securing sustainable small-scale fisheries in the context of food security and poverty eradication. Food and Agricultural Organisation, Rome. 18 pp.

Foley, P., Pinkerton, E., Wiber, M., and Stephenson, R. 2020. Full-spectrum sustainability: an alternative to fisheries management panaceas. Ecology and Society, 25. The Resilience Alliance. https://www.ecologyandsociety.org/vol25/iss2/art1/.

Folke, C., Hahn, T., Olsson, P., and Norberg, J. 2005. Adaptive governance of social–ecological systems. Annual Review of Environment and Resources, 30: 441–473.

Fowler, J. L., and Boyd, A. J. 1998. Transport of anchovy and sardine eggs and larvae from the western Agulhas bank to the west coast during the 1993/94 and 1994/95 spawning seasons. African Journal of Marine Science, 19: 23–38.

Gaasland, I., Straume, H.-M., and Vårdal, E. 2020. Agglomeration and trade performance–evidence from the Norwegian salmon aquaculture industry. Aquaculture Economics & Management, 24: 181–193. Taylor & Francis.

Gadd, A. 2024. History of Kleinzee, Northern Cape, South Africa. https://southafrica.co.za/history-kleinzee.html (Accessed 5 November 2024).

Gammage, L., and Jarre, A. 2020. Using structured decision-making tools with marginalised fishers to promote system-based fisheries management approaches. Frontiers in Marine Science, 7.

Gammage, L., Jarre, A., and Mather, C. 2021. Failing to plan is planning to fail: lessons learned from a small-scale scenario planning process with marginalized fishers from South Africa's southern Cape. Ecology and Society, 26. The Resilience Alliance.

Gammage, L. C., Jarre, A., and Mather, C. 2017. A case study from the southern Cape linefishery 1: The difficulty of fishing in a changing world. South African Journal of Science, 113: 1–8. Academy of Science of South Africa.

Gibson, C., Ostrom, E., and Ahn, T. K. 2000. The Concept of Scale and the Human Dimensions of Global Change. Ecological Economics, 32: 217–239.

Goble, B. J., Lewis, M., Hill, T., and Phillips, M. R. 2014. Coastal Management in South Africa: Historical perspectives and setting the stage of a new era. Ocean & Coastal Management, 91: 32–40.

Griffiths, C. L., Robinson, T. B., Lange, L., and Mead, A. 2010. Marine Biodiversity in South Africa: An Evaluation of Current States of Knowledge. PLoS ONE, 5: e12008.

Griffiths, M. H. 2002. Life history of South African snoek, *Thyrsites atun* (Pisces: Gempylidae): a pelagic predator of the Benguela ecosystem. Fishery Bulletin, 100: 690–711. National Marine Fisheries Service.

Grüss, A., Yemane, D., and Fairweather, T. 2016. Exploring the spatial distribution patterns of South African Cape hakes using generalised additive models. African Journal of Marine Science, 38: 395–409.

Gutiérrez, N. L., Hilborn, R., and Defeo, O. 2011. Leadership, social capital and incentives promote successful fisheries. Nature, 470: 386–389.

Hara, M., Greenberg, S., Thow, A. M., and Chimarito, S. 2017. Trade and investment in fish and fish products between South Africa and the rest of SADC: implications for food and nutrition security'. Working Paper 47. PLAAS, UWC, Cape Town. https://uwcscholar.uwc.ac.za:8443/server/api/core/bitstreams/1b603071-714c-41fb-b73f-49f95ff9970d/content.

Harris, L. R., Holness, S. D., Finke, G., Amunyela, M., Braby, R., Coelho, N., Gee, K., *et al.* 2022. Practical marine spatial management of ecologically or biologically significant marine areas: emerging lessons from evidence-based planning and implementation in a developing-world context. Frontiers in Marine Science, 9: 1–25.

Horton, M., Parker, D., Winker, H., Lamberth, S., Hutchings, K., and Kerwath, S. 2019. Age, growth and per-recruit stock assessment of southern mullet *Chelon richardsonii* in Saldanha Bay and Langebaan Lagoon, South Africa. African Journal of Marine Science, 41: 313–324.

Huggett, J. A., Boyd, A. J., Hutchings, L., and Kemp, A. D. 1998. Weekly variability of clupeoid eggs and larvae in the Benguela jet current: implications for recruitment. African Journal of Marine Science, 19: 153–164.

Human, L. 2021, December 15. Meet the woman at the centre of Port Nolloth's crayfish trade. https://groundup.org.za/article/meet-the-woman-at-the-centre-of-port-nolloths-crayfish-trade/ (Accessed 1 December 2024).

Hutchings, L., Beckley, L. E., Griffiths, M. H., Roberts, M. J., Sundby, S., and Van Der Lingen, C. 2002. Spawning on the edge: spawning grounds and nursery areas around the southern African coastline. Marine and Freshwater Research, 53: 307–318.

Hutchings, L., van der Lingen, C. D., Shannon, L. J., Crawford, R. J. M., Verheye, H. M. S., Bartholomae, C. H., van der Plas, A. K., *et al.* 2009. The Benguela Current: An ecosystem of four components. Progress in Oceanography, 83: 15–32. Pergamon.

IPBES. 2018. The IPBES regional assessment report on biodiversity and ecosystem services for Africa. Zenodo. https://zenodo.org/records/3236178 (Accessed 16 May 2025).

Isaacs, M. 2013. Small-scale fisheries governance and understanding the Snoek (*Thyrsites atun*) supply chain in the Ocean View fishing community, Western Cape, South Africa. Ecology and Society, 18: 17.

Jansen, T., Kainge, P., Singh, L., Wilhelm, M., Durholtz, D., Strømme, T., Kathena, J., *et al.* 2015. Spawning patterns of shallow-water hake (*Merluccius capensis*) and deep-water hake (*M. paradoxus*) in the Benguela Current Large Marine Ecosystem inferred from gonadosomatic indices. Fisheries Research, 172: 168–180.

Japp, D., and Wilkinson, S. 2021. Environmental impact assessment for marine prospecting activities in South African sea areas 14B, 15B and 17B West Coast, South Africa. Commercial fisheries assessment, Belton Park Trading: Concession 14b, 15b, 17b. SLR.

Jarre, A., Ragaller, S. M., and Hutchings, L. 2013. Long-term, ecosystem-scale changes in the southern Benguela marine pelagic social-ecological system: Interaction of natural and human drivers. Ecology and Society, 18: 55. Resilience Alliance Inc.

Jarre, A., Hutchings, L., Kirkman, S. P., Kreiner, A., Tchipalanga, P., Kainge, P., Uanivi, U., *et al.* 2015. Synthesis: Climate effects on biodiversity, abundance and distribution of marine organisms in the Benguela. Fisheries Oceanography, 24: 122–149.

Jarre, A., Shannon, L. J., Cooper, R., Duggan, G. L., Gammage, L. C., Lockerbie, E. M., McGregor, E. S., *et al.* 2018. Untangling a Gordian knot that must not be cut: Social-ecological systems research for management of southern Benguela fisheries. Journal of Marine Systems, 188: 149–159. Elsevier.

Kainge, P., Kjesbu, O., Thorsen, A., and Salvanes, A. 2007. *Merluccius capensis* spawn in Namibian waters, but do *M. paradoxus*? African Journal of Marine Science, 29: 379–392. Taylor & Francis.

Kidd, S., and Shaw, D. 2014. The social and political realities of marine spatial planning: Some land-based reflections. ICES Journal of Marine Science, 71: 1535–1541. Oxford University Press.

Lamberth, S., and Whitfield, AK. 2013. Southern mullet (*Liza richardsonii*). *In* Southern African marine linefish species profiles., pp. 125–127. Oceanographic Research Institute, Durban.

Lang, D. J., Wiek, A., Bergmann, M., Stauffacher, M., Martens, P., Moll, P., Swilling, M., *et al.* 2012. Transdisciplinary research in sustainability science: practice, principles, and challenges. Sustainability Science, 7: 25–43.

Levine, S., Pain, A., Bailey, S., and Fan, L. 2012. The relevance of 'resilience'. Overseas Development Institute. https://www.rcrc-resilience-southeastasia.org/wp-content/uploads/2016/08/HPG_Policy_Brief_The_Relevance_of_Resilience.pdf.

Lombard, A. T., Ban, N. C., Smith, J. L., Lester, S. E., Sink, K. J., Wood, S. A., Jacob, A. L., *et al.* 2019. Practical Approaches and Advances in Spatial Tools to Achieve Multi-Objective Marine Spatial Planning. Frontiers in Marine Science, 6: 1–9. Frontiers Media S.A.

Malan, N. 2018. Review of Progress with Integrated Coastal Management in South Africa Since the Advent of Democracy. African Journal of Marine Science, 40: 121–136.

Marais, C. 2023. Alexander Bay: Memories of a diamond dorp on the West Coast. https://www.dailymaverick.co.za/article/2023-04-04-diamond-rush-the-precious-memories-of-a-diamond-dorp-on-the-west-coast/ (Accessed 11 December 2024).

Martins, I. M. M., Gammage, L. C. C., Jarre, A., and Gasalla, M. A. 2019. Different but similar? Exploring vulnerability to climate change in Brazilian and South African small-scale fishing communities. Human Ecology, 47: 515–526.

Masson, E. 2022, July 3. War for diamonds: toil and triumph on the rich barren plains. https://mg.co.za/news/2022-07-03-war-on-diamonds-toil-and-triumph-on-the-rich-barren-plains/ (Accessed 20 September 2024).

Masterson. 2021, October 10. The West Coast's oil and gas frenzy. https://protectthewestcoast.org/post/the-west-coasts-oil-and-gas-frenzy/ (Accessed 6 December 2024).

McCarthy, J., and Thomas, M. 2017. International and National Principles and Area Based Local Application for Sustainable Coastal Development. Journal of Coastal Zone Management, 20.

McGrath, A. 2024. Fisheries Specialist Assessment. *In* ESIA for Exploration Drilling in Block Northern Cape Ultra Deep, South Africa, p. 130. SLR Consulting (South Africa) Proprietary Limited. https://cdn.sanity.io/files/b0ecix6u/production/ab6b9a01ca0078658a6f52081bcf8144357371a4.pdf (Accessed 4 December 2024).

Mhlongo, N., Yemane, D., Hendricks, M., and van der Lingen, C. D. 2015. Have the spawning habitat preferences of anchovy (*Engraulis encrasicolus*) and sardine (*Sardinops sagax*) in the southern Benguela changed in recent years? Fisheries Oceanography, 24: 1–14.

Moloney, C. L., Fennessy, S. T., Gibbons, M. J., Roychoudhurye, A., Shillington, F. A., von der Heydene, B. P., and Watermeyer, K. 2013. Reviewing evidence of marine ecosystem change off South Africa. African Journal of Marine Science, 35: 427–448.

Municipalities of South Africa. 2024. Municipalities of South Africa: Northern Cape Municipalities. https://municipalities.co.za/provinces/view/7/northern-cape (Accessed 19 September 2024).

Namakwa District Municipality. 2023. Municipality Vulnerability Assessment and Climate Change Response Plan. Local Government Climate Change Support Program. https://www.namakwa-dm.gov.za/wp-content/uploads/2023/04/Northern-Cape-Climate-Change-Response-Plan-Namakwa-2023.pdf.

Namakwa-Info. 2024. Hondeklip Bay Travel Information. https://www.namakwa-info.co.za/region/town/521 (Accessed 29 October 2024).

Norström, A. V., Cvitanovic, C., Löf, M. F., West, S., Wyborn, C., Balvanera, P., Bednarek, A. T., *et al.* 2020. Principles for knowledge co-production in sustainability research. Nature Sustainability, 3: 182–190. Nature Publishing Group.

Northern Cape Provincial Government. 2024. Northern Cape Socio-Economic Review 2024.

Nortje, J. M., and van Wyk, B.-E. 2019. Useful plants of Namaqualand, South Africa: a checklist and analysis. South African Journal of Botany, 122: 120–135.

Norton, M. 2015. The militarisation of marine resource conservation and law enforcement in the Western Cape, South Africa. Marine Policy, 60: 338–344.

Olsson, P., Folke, C., and Berkes, F. 2004. Adaptive Comanagement for Building Resilience in Social–Ecological Systems. Environmental Management, 34: 75–90.

Ortega-Cisneros, K., Cochrane, K. L., Rivers, N., and Sauer, W. H. H. 2021. Assessing South Africa's Potential to Address Climate Change Impacts and Adaptation in the Fisheries Sector. Frontiers in Marine Science, 8. https://www.frontiersin.org/articles/10.3389/fmars.2021.652955 (Accessed 17 September 2023).

Ostrom, E. 2009. A General Framework for Analyzing Sustainability of Social-Ecological Systems. Science, 325: 419–423.

Partelow, S., and Winkler, K. J. 2016. Interlinking ecosystem services and Ostrom's framework through orientation in sustainability research. Ecology and Society, 21.

Penney, A. J., Krohn, R. G., and Wilke, C. G. 1992. A description of the South African tuna fishery in the. ICCAT Col. Vol. Sci. Pap 29, no. 1: 247–253.

Petrova, S., and Marinova, D. 2013. Social impacts of mining: Changes within the local social landscape. *In* Rural Society, pp. 153–165.

Plieninger, T., and Bieling, C. 2012. Resilience and the cultural landscape: understanding and managing change in human-shaped environments. Cambridge University Press.

Ramasar, V. 2004. Northern Cape State of the Environment Report 2004: Marine and Coast Specialist Report. Department of Tourism, Environment & Conservation, Pretoria, South Africa.

Rebelo, X. 2021. Sustainability, Disaster Risk Reduction and Climate Change Adaptation: Building From the Bottom Up – A South African Perspective from the Small-Scale Fisheries Sector: 151–181.

Rivers, N., Truter, H. J., Strand, M., Jay, S., Portman, M., Lombard, A. T., Amir, D., *et al.* 2022. Shared visions for marine spatial planning: Insights from Israel, South Africa, and the United Kingdom. Ocean & Coastal Management, 220: 106069.

Roche, C., and Bice, S. 2013. Anticipating social and community impacts of deep sea mining'. *In* Deep Sea Minerals and the Green Economy. Ed. by E. Baker and Y. Beaudoin. Secretariat of the Pacific Community (SPC), New Caledonia.

Roy, C., and Fréon, P. 2001. An empirical model of anchovy recruitment variability in the southern Benguela. Small pelagic fishes and climate change programme, GLOBEC Report No.16. Cape Town, South Africa.

Sales, J., and Britz, P. 2001. Research on abalone (*Haliotis midae L.*) cultivation in South Africa. Aquaculture Research, 32: 863–874.

Saunders, F., Gilek, M., Ikauniece, A., Tafon, R. V., Gee, K., and Zaucha, J. 2020. Theorizing social sustainability and justice in marine spatial planning: Democracy, diversity, and equity. Sustainability (Switzerland), 12. MDPI AG.

Seneviratne, S. I., Zhang, X., Adnan, M., Badi, W., Dereczynski, C., Di Luca, A., Ghosh, S., *et al.* 2023. Weather and climate extreme events in a changing climate. *In* Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate

Change. [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)], 1st edn, pp. 1513–1766. Cambridge University Press, United Kingdom and New York. https://www.cambridge.org/core/product/identifier/9781009157896/type/book (Accessed 13 December 2024).

Sink, K. J., Van Der Bank, M. G., Majiedt, P. A., Harris, L. R., Atkinson, L. J., Kirkman, S. P., and Karenyi, N. F. 2019. South African National Biodiversity Assessment 2018 Technical Report Volume 4: Marine Realm. South African National Biodiversity Institute. http://hdl.handle.net/20.500.12143/6372.

Soudens, C. 2022. Dear Barbara Creecy, how can we celebrate Women's Day when our women's and environmental rights are violated? https://www.dailymaverick.co.za/article/2022-08-04-dear-barbara-creecy-our-womens-and-environmental-rights-are-violated/ (Accessed 1 December 2024).

Sowman, M. 2011. New Perspectives in Small-Scale Fisheries Management: Challenges and Prospects for Implementation in South Africa. African Journal of Marine Science, 33: 297–311.

Sowman, M., Scott, D., Green, L. J. F., Hara, M. M., Hauck, M., Kirsten, K., and Paterson, B. 2013. Shallow waters: social science research in South Africa' s marine environment. African Journal of Marine Science: 37–41.

Sowman, M. 2020. Participatory and rapid vulnerability assessments to support adaptation planning in small-scale fishing communities of the Benguela current large marine ecosystem. Environmental Development: 100578. Elsevier B.V.

Sowman, M., and Sunde, J. 2021. A just transition? Navigating the process of policy implementation in small-scale fisheries in South Africa. Marine Policy, 132: 104683.

Sowman, M., and Sunde, J. 2024. Integrating environmental sustainability and social justice principles into South Africa's blue economy initiative: re-imagining the political economy of our ocean. Frontiers in Ocean Sustainability, 2. Frontiers. https://www.frontiersin.org/journals/ocean-sustainability/articles/10.3389/focsu.2024.1459496/full (Accessed 13 December 2024).

Standing, A. 2017. Criminality in Africa's Fishing Industry: A Threat to Human Security. Africa Center for Strategic Studies. http://www.africacenter.org/.

StatsSA. 2022. Statistics South Africa | Census Dissemination. https://census.statssa.gov.za/#/province/3/2 (Accessed 28 October 2024).

Stenevik, E. K., Verheye, H. M., Lipinski, M. R., Ostrowski, M., and Strømme, T. 2008. Drift routes of Cape hake eggs and larvae in the southern Benguela Current system. Journal of Plankton Research, 30: 1147–1156.

Stephenson, R. L., Hobday, A. J., Allison, E. H., Armitage, D., Brooks, K., Bundy, A., Cvitanovic, C., *et al.* 2021. The Quilt of Sustainable Ocean Governance: Patterns for Practitioners. Frontiers in Marine Science, 8.

Strand, M., Rivers, N., and Snow, B. 2022. Reimagining Ocean Stewardship: Arts-Based Methods to 'Hear' and 'See' Indigenous and Local Knowledge in Ocean Management. Frontiers in Marine Science, 9. Frontiers. https://www.frontiersin.org/journals/marine-science/articles/10.3389/fmars.2022.886632/full (Accessed 16 May 2025).

Strømme, T., Lipinski, M. R., and Kainge, P. 2016. Life cycle of hake and likely management implications. Reviews in Fish Biology and Fisheries, 26: 235–248.

Taljaard, S., van Niekerk, L., and Weerts, S. P. 2019. The legal landscape governing South Africa's coastal marine environment – helping with the 'horrendogram'. Ocean & Coastal Management, 178: 104801.

Teske, P. R., Emami-Khoyi, A., Golla, T. R., Sandoval-Castillo, J., Lamont, T., Chiazzari, B., McQuaid, C. D., *et al.* 2021. The sardine run in southeastern Africa is a mass migration into an ecological trap. Science Advances, 7: 34524856.

Toomey, A. H., Markusson, N., Adams, E., and Brockett, B. 2015. Inter- and Trans-disciplinary Research: A Critical Perspective. GSDR Brief.

Troell, M., Robertson-Andersson, D., Anderson, R. J., Bolton, J. J., Maneveldt, G., Halling, C., and Probyn, T. 2006. Abalone farming in South Africa: An overview with perspectives on kelp resources, abalone feed, potential for on-farm seaweed production and socio-economic importance. Aquaculture, 257: 266–281.

Tulier, M. E., Reid, C., Mujahid, M. S., and Allen, A. M. 2019. "Clear action requires clear thinking": A systematic review of gentrification and health research in the United States. Health & Place, 59: 102173.

United Nations. 1992. Assessment of the Environmental Impact of Port Development: A Guidebook for EIA of Port Development. New York. https://www.unescap.org/sites/default/files/pub_1234_fulltext.pdf.

van der Lingen, C. D., Hutchings, L., Merkle, D., Van der Westhuizen, J. J., and Nelson, J. 2001. Comparative spawning habitats of anchovy (Engraulis capensis) and sardine (Sardinops sagax) in the southern Benguela upwelling ecosystem. Spatial processes and management of marine populations, 185, p.209. *In* Spatial Processes and Management of Marine Populations. University of Alaska Sea Grant., Anchorage, USA.

van der Lingen, C. D., and Huggett, J. A. 2003. The role of ichthyoplankton surveys in recruitment research and management of South African anchovy and sardine. *In* Proceedings of the 26th Annual Larval Fish Conference (Eds H.I. Browman & A. B. Skiftesvik), pp. 303–343. Institute of Marine Research, Bergen, Norway.

Van Zyl, M. 2009. Ocean, time and value: Speaking about the sea in Kassiesbaai. Anthropology Southern Africa, 32: 48–58. Taylor & Francis.

Vervoort, J. M., Rutting, L., Kok, K., Hermans, F. L. P., Veldkamp, T., Bregt, A. K., and van Lammeren, R. 2012. Exploring dimensions, scales, and cross-scale dynamics from the perspectives of change agents in social-ecological systems. Ecology and Society, 17.

Virapongse, A., Brooks, S., Metcalf, E. C., Zedalis, M., Gosz, J., Kliskey, A., and Alessa, L. 2016. A social-ecological systems approach for environmental management. Journal of Environmental Management, 178: 83–91. Elsevier Ltd.

Wilkinson, S., and Coppin, R. 2024. Specialist Fisheries Assessment. *In* Impact assessment for a prospecting right application for sea areas 11A,12A, West Coast, South AFrica. SLR Consulting.

Williams, S. 2021. 'I fish because I am a fisher': Exploring livelihood and fishing practices to justify claims for access to small scale fisheries resources in South Africa. HTS Teologiese Studies/Theological Studies, 77.

Woods Hole Oceanographic Institution. 2025. Currents, Gyres, & Eddies - Woods Hole Oceanographic Institution. https://www.whoi.edu/know-your-ocean/ocean-topics/how-the-ocean-works/ocean-circulation/currents-gyres-eddies/ (Accessed 16 May 2025).

Zaucha, J., and Gee, K. 2019. Maritime spatial planning: past, present, future. Palgrave Macmillan, Cham, Switzerland.

6.6 DIGITAL APPENDICES 6-1 & 6-2

SEPARATE DIGITAL DOCUMENTS

Appendix 6-1:	Stakeholder Typologies
Appendix 6-2:	Fisheries and Coastal Livelihoods