PART 3.5

Socio-Economics

CONTENTS

FIGURES

PART 3. SCIENTIFIC ASSESSMENT OF AQUACULTURE DEVELOPMENT ZONES

Section 3.5 Socio-Economics

In 1974, aquaculture has contributed only 7% to global fish supply, a value that has significantly increased to 47% by 2016. The Food and Agriculture Organisation (FAO) of the United Nations has recorded an all-time high aquaculture production of approximately 80.4 million tonnes during 2016 (FAO, 2018). Being considered the fastest growing food industry in the world, aquaculture development has the potential to make a meaningful contribution to the social and economic well-being of many countries and communities.

In South Africa, Operation Phakisa has acknowledged the potential of marine and freshwater aquaculture to contribute to social and economic upliftment through its Aquaculture work stream under the Oceans Economy which not only aims to increase revenue from the aquaculture sector from R 0.67 billion to R 3 billion but to also create between 2 500 and 15 000 new direct and full time jobs over a period of five years (2014 – 2019).

3.5.1 Environmental Attributes

3.5.1.1 Social Vulnerability Index

Le Roux and Naudé (2014)[1] has created a **Social Vulnerability Index** to support national decision-makers in South Africa. This index include indicators such as the percentage of the population that is age dependent, unemployed, living below the poverty line, living in rural areas, disabled, aged 25 with no education and without South African citizenship, as well as the percentage of households that are female headed, using non-electric sources of energy for cooking, without telephone lines, without a car and without access to public water. The index also gives an indication of the average household size and what percentage of dwellings are shacks. It is the composite of these indicators that allocate a vulnerability value to a specific area.

The profiling of vulnerable communities is seen as the first step to plan for resilient communities, i.e. determining how vulnerable a community or group of people is within a generic framework of multiple stressors. Social vulnerability can therefore be considered as the "inability of people, settlements and societies to withstand or adapt to the impact of multiple stressors such as disruptive natural or manmade events".

In the case of aquaculture, especially if multiple large scale aquaculture projects are to be introduced into an area, there is a need to understand the social resilience of the receiving community to adapt to this change and to identify suitable measures to manage the social and economic vulnerabilities present.

This index also provided a mechanism to compare the vulnerability of the various marine and freshwater study areas, and the associated risks or opportunities to each other (at the given scale of assessment). In addition, each study area may be characteristic of various social vulnerability classes, which makes each locality within a study area a unique unit. It is therefore not only the study area's location (inland or coastal) that will influence the risk or opportunities arising from aquaculture development but also the specific location of an aquaculture project within a study area.

3.5.1.2 Socio-economic Intensity Index

Aquaculture can potentially provide economic incentives to the local, regional and national economy through market interactions, value chains and employment opportunities which will result in greater income and increased expenditure in an area.

To identify the economic opportunities associated with aquaculture, there needs to be an understanding of the status quo of the affected local municipalities' economic output (bearing in mind the strategic level at which this assessment was undertaken).

Ngidi and van Huyssteen (2017)[2] compiled a **Socio-Economic Intensity Index** for municipalities in South Africa. A parameter that informed the index was the Gross Value Added (GVA) to determine the economic output of each municipality. The GVA used within the index was calculated based on the Real GVA at basic prices (in Rand millions) at 2010 prices to ensure temporal comparability and the weighted GVA growth between 2011 and 2016 of each municipality, compared with the national absolute growth of 7.8%. The latter was used to compare the growth of one municipality in relation to other municipalities.

The majority of local municipalities comprised within the 17 marine and freshwater study areas have a GVA growth that is on par with national growth. A limited number of local municipalities within the Vanderkloof-Gariep, Vaalharts and East London – Kei Mouth study areas have a GVA growth that is either below the national growth or a GVA that is declining.

3.5.2 Sensitivity Mapping

The first key consideration to understanding the potential socio-economic opportunities and risks associated with aquaculture development is the socio-economic setting within each study area. Secondly, the type of aquaculture (freshwater or marine) and the scale of aquaculture operations (subsistence or commercial) proposed within a study area must be considered, since each option comes with its distinct environmental, social and economic impacts.

During the sensitivity analysis a level of complexity has emerged given the scale, scope and uncertainties inherent within this strategic level assessment. To address the complexity issue effectively and realistically, the Social Vulnerability Index and Gross Value Added of local municipalities, in addition to the Socio-Economic Intensity Index, were used to determine the risks and opportunities associated with proposing aquaculture development in the 17 different study areas.

3.5.3 Key Potential Risks and Opportunities

3.5.3.1 Macro-economic opportunities

One of the key opportunities associated with commercial scale aquaculture development is the potential to **contribute to the macro-economy of South Africa**. The economic opportunities within local municipalities that have a declining Gross Value Added compared with national growth have been identified to have a high opportunity rating, given that suitable management measures are adopted.

3.5.3.2 Rural development and livelihoods opportunities

The contribution of aquaculture to rural and livelihood development potentially comes with various social prospects. This includes the **creation of new employment opportunities, provision of food security and upliftment of fishing communities**. Also, supporting the development of commercial scale aquaculture creates the **opportunity for stimulating and diversifying income of subsistence level aquaculture**. The social opportunities within high vulnerability areas have been identified to have a high opportunity rating, following the implementation of the recommended mitigation measures.

[1] Le Roux, A. and Naudé, A. 2014. CSIR Regional Dynamics and Interactions Analyses Note: Social Vulnerability – Locating South Africa's vulnerable people. Available on: www.Stepsa/regionaldynamics.org.za

[2] Ngidi, M. and van Huyssteen, E., 2017. Methodological Report for Socio-economic profiles to inform the identification of Renewable Energy Development Zones (REDZs) in support of the Phase 2 Wind and Solar Strategic Environmental Assessment, CSIR Built Environment. CSIR Report number: CSIR/IU/021MH/IR/2017/0012/B.

3.5.3.3 User conflict risks

Commercial scale aquaculture development poses the risk of **potentially conflicting with or even displacing existing users** of both coastal waters and inland surface water resources. Large state-owned dams, which could support instream cage culture operations but for which resource management plans do not currently exist, could result in conflict with or displacement of current users e.g. fishermen.

3.5.3.4 Human health risks

Aquaculture operations, especially if not properly managed, could pose a serious **risk to human health**. Health issues resulting from aquaculture activities could be the cause of **microbial and chemical contamination**, or **nutrient enrichment of the water** resource.

3.5.3.5 Cumulative impacts, risks and opportunities

The identified social risks and economic opportunities would all be amplified if more than one aquaculture development occurs within the same immediate socio-economic system. Also, if required managed and mitigation measures are not implemented by the aquaculture developments, the risk to human health would increase locally and could have a downstream impact. Setting threshold limits for water quality will enable the establishment of the appropriate density of aquaculture developments given the carrying capacity of an area or specific water body.

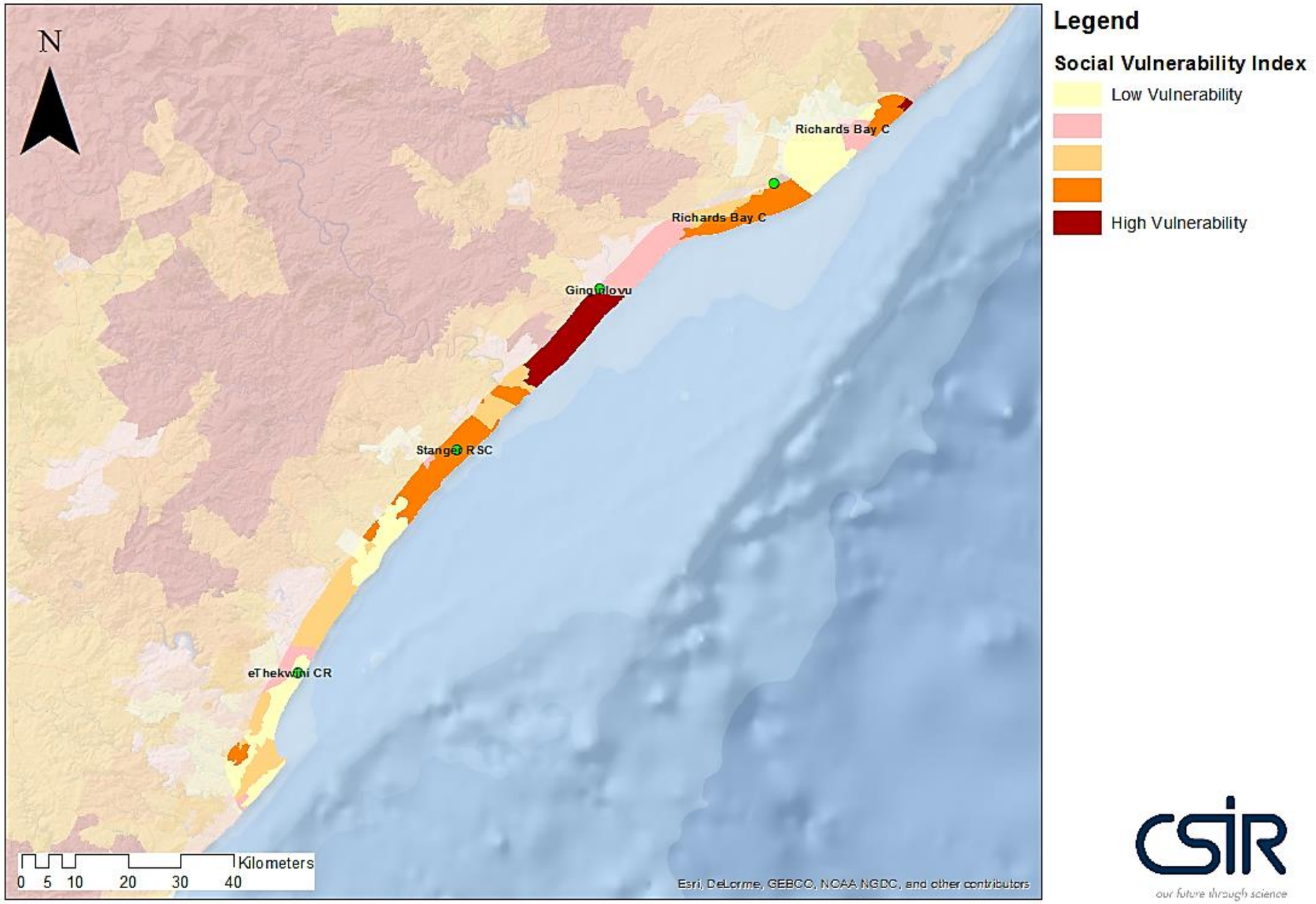

Figure 3.5-1: Social vulnerability of the Durban – Richard Bay Marine Study Area

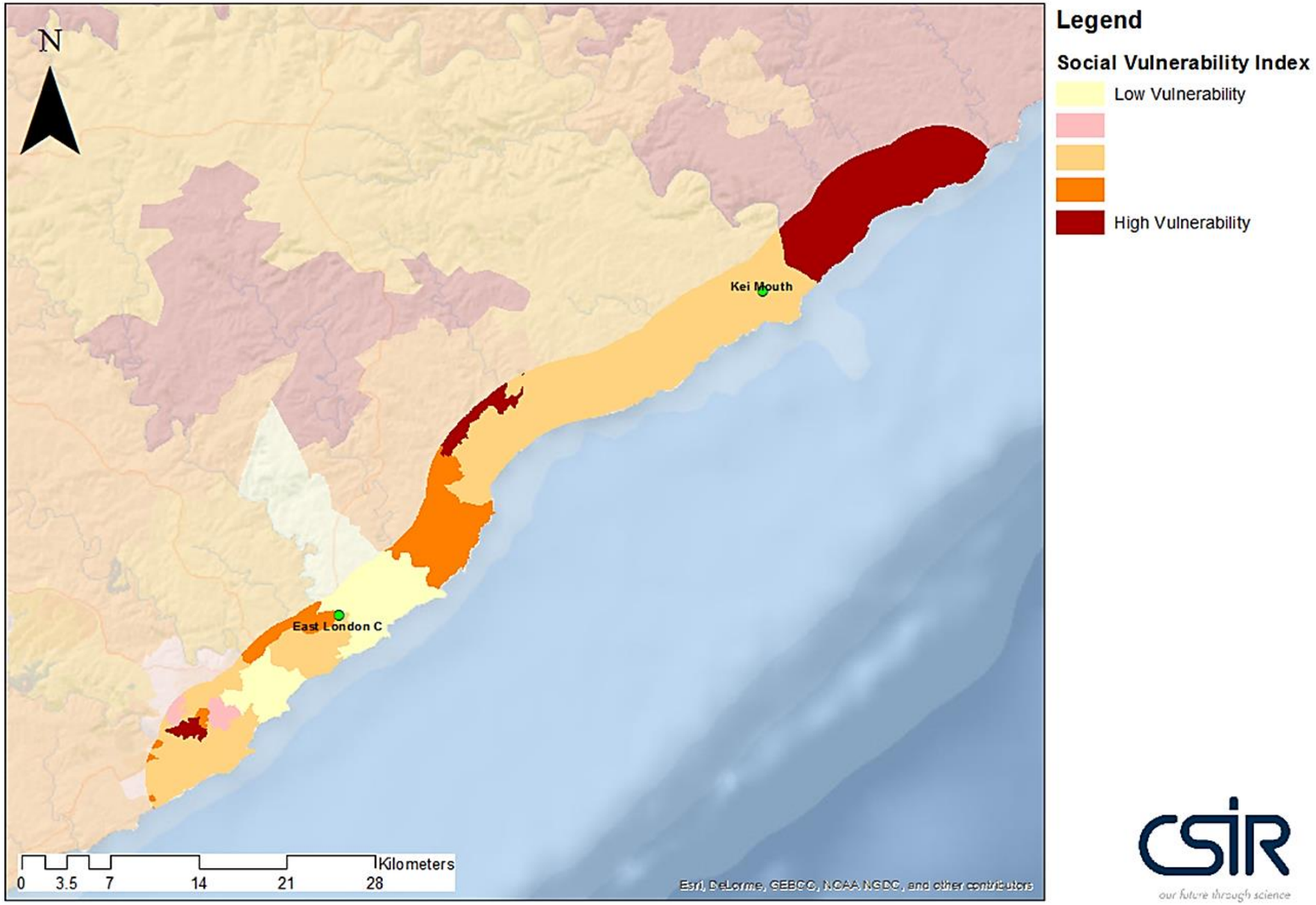

Figure 3.5-2: Social vulnerability of the East London – Kei Mouth Marine Study Area

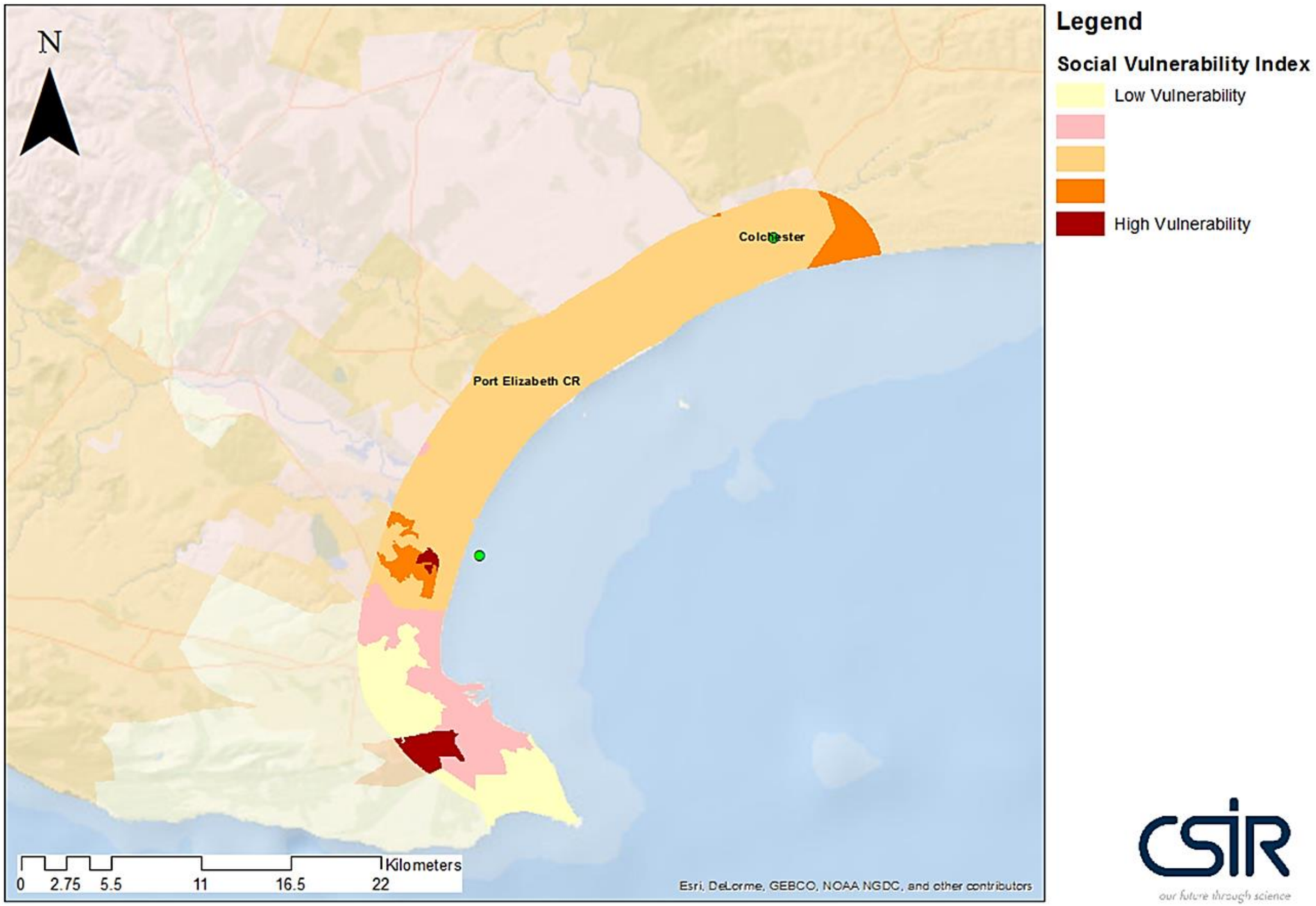

Figure 3.5-3: Social vulnerability of the Port Elizabeth Marine Study Area

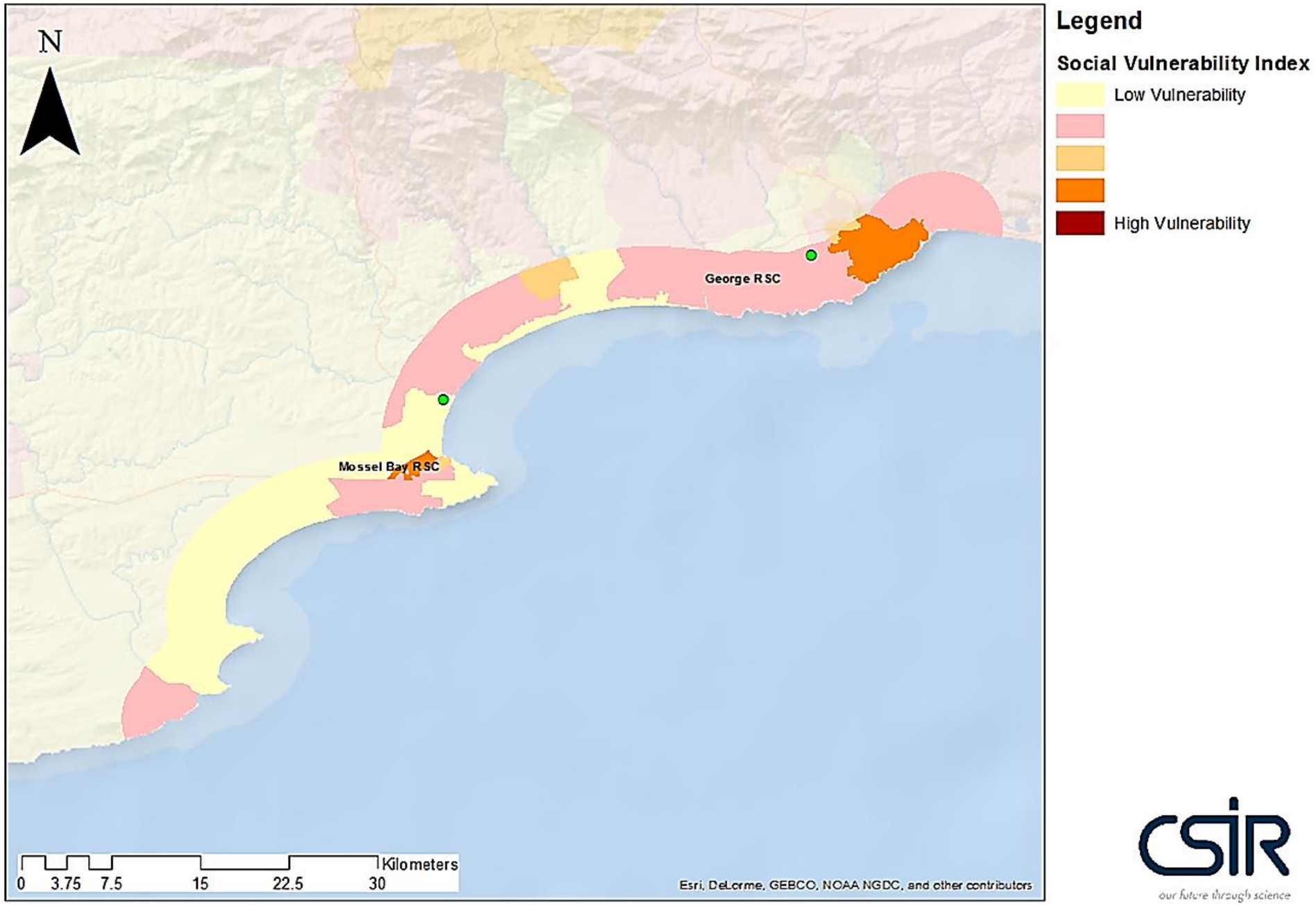

Figure 3.5-4: Social vulnerability of the Gouritz – George Marine Study Area

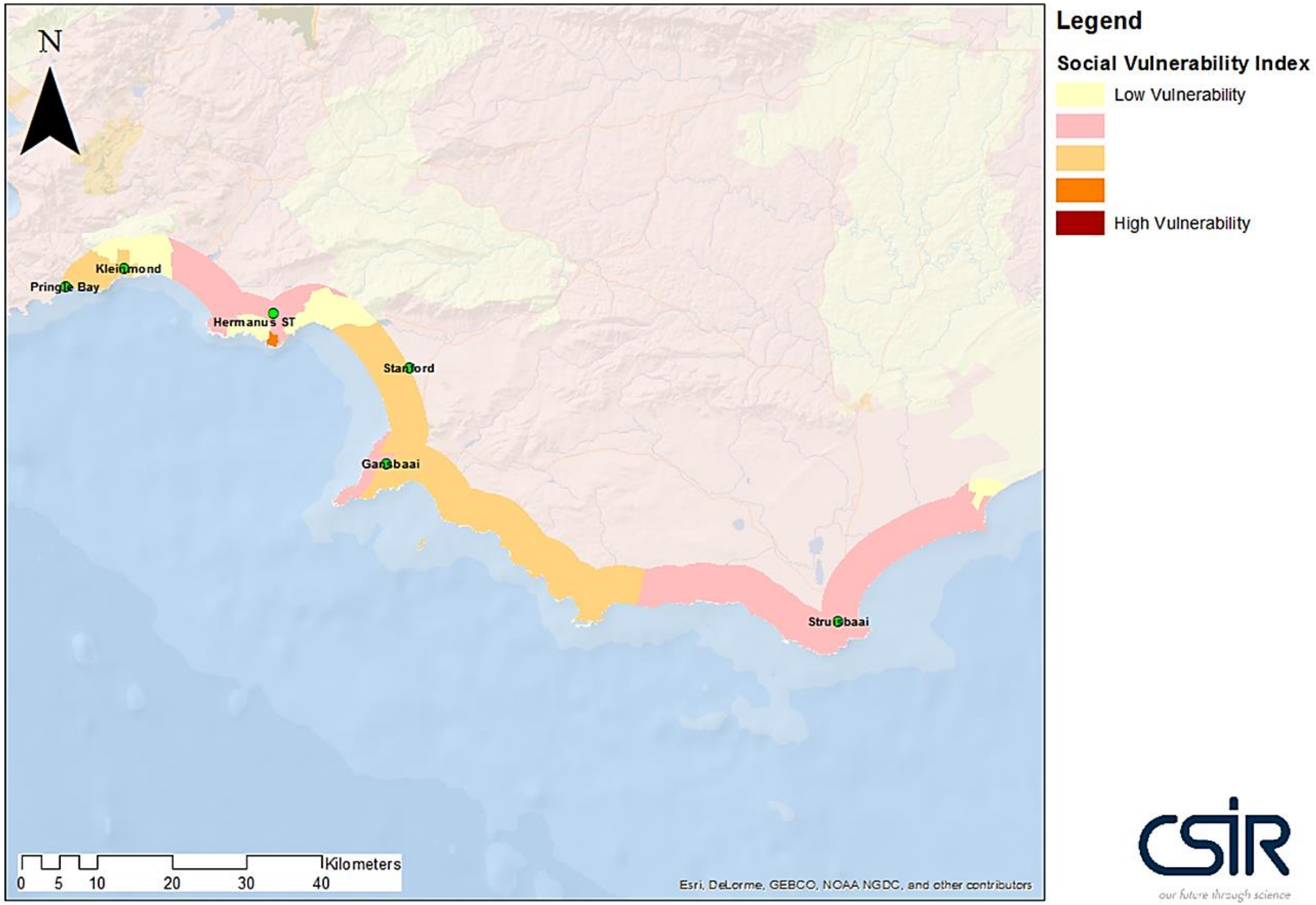

Figure 3.5-5: Social vulnerability of the Hermanus – Arniston Marine Study Area

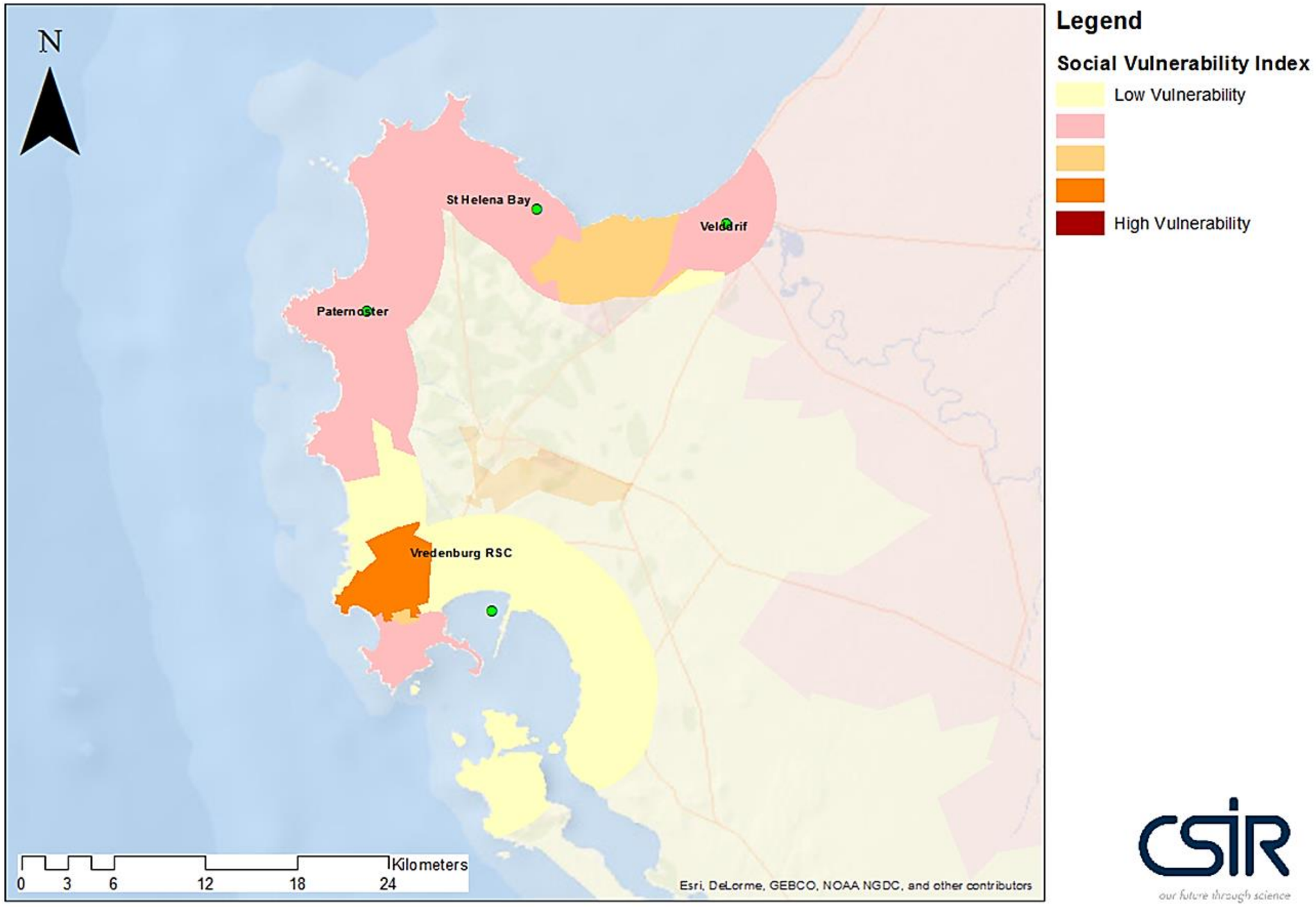

Figure 3.5-6: Social vulnerability of the Velddrif – Saldanha Marine Study Area

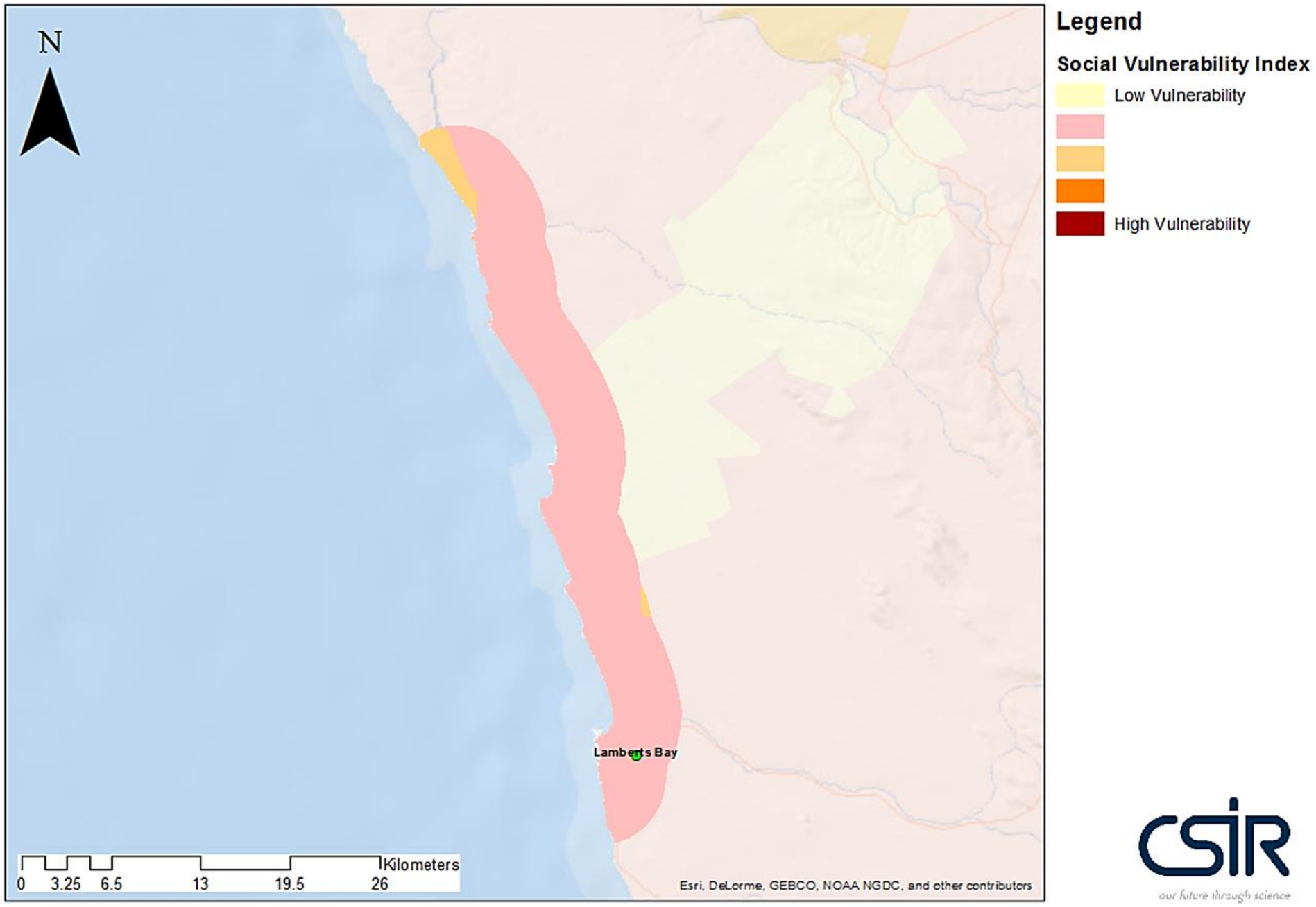

Figure 3.5-7: Social vulnerability of the Strandfontein – Lamberts Bay Marine Study Area

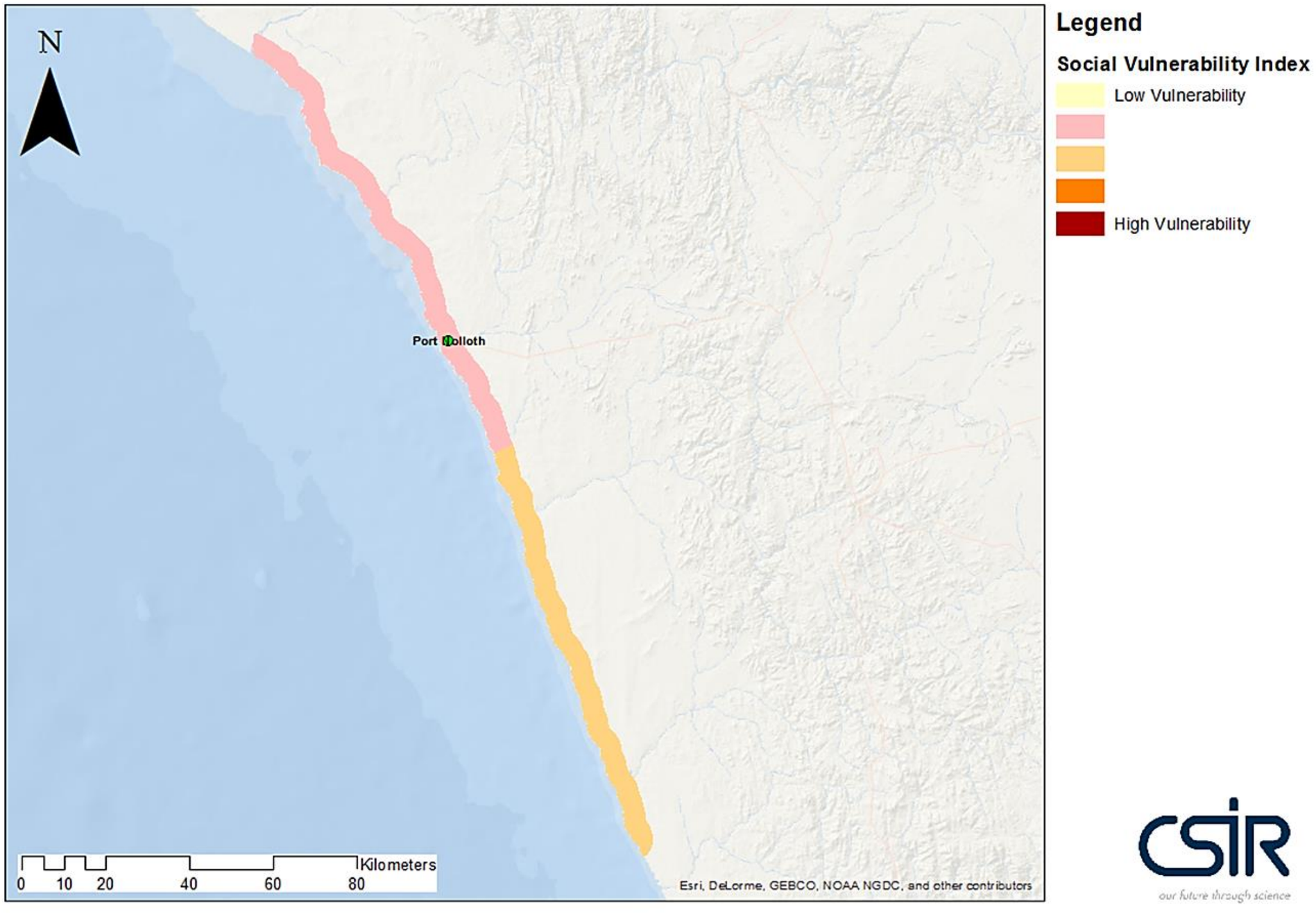

Figure 3.5-8: Social vulnerability of the Orange – Hondeklip Bay Marine Study Area

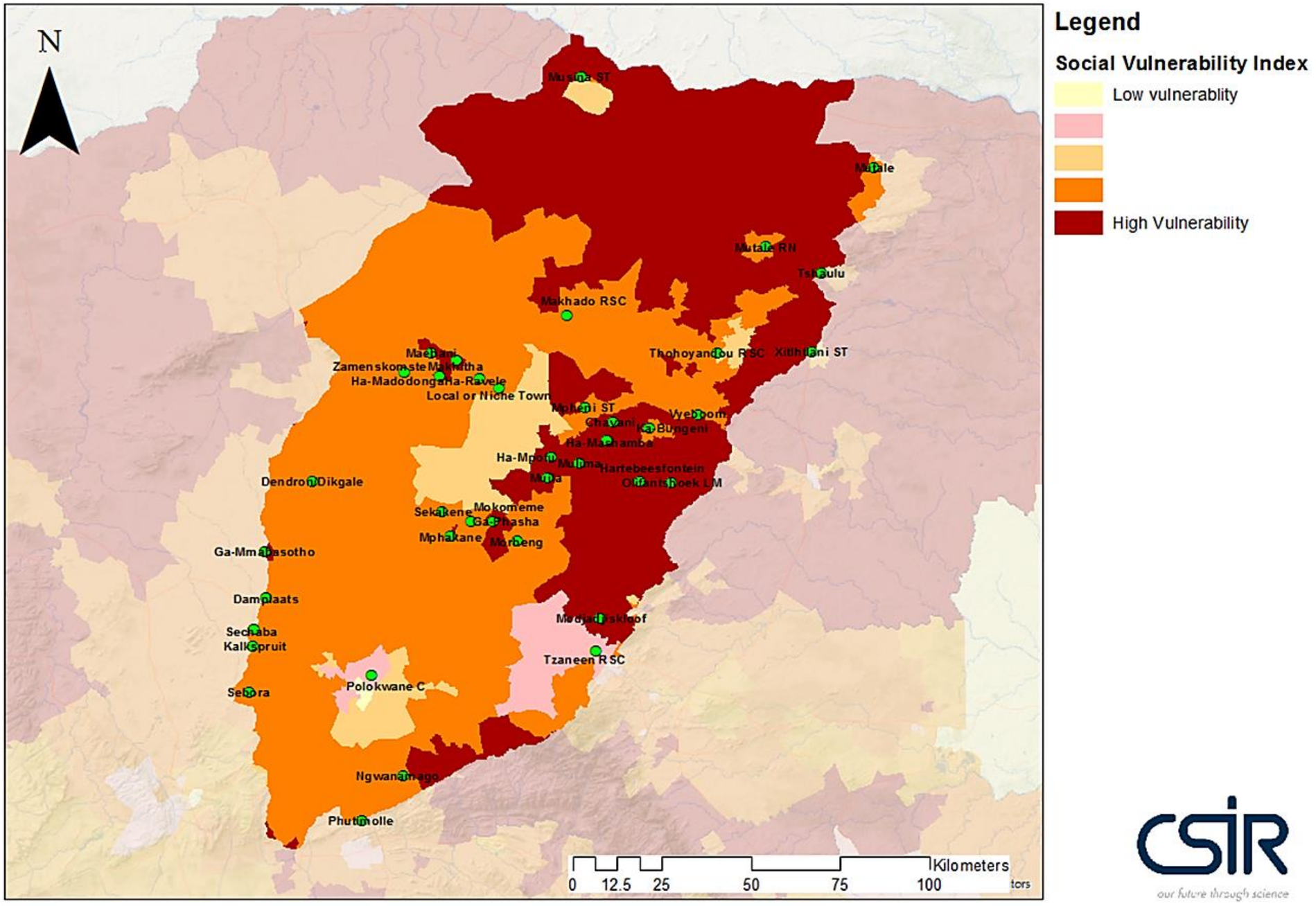

Figure 3.5-9: Social vulnerability of the Limpopo Freshwater Study Area

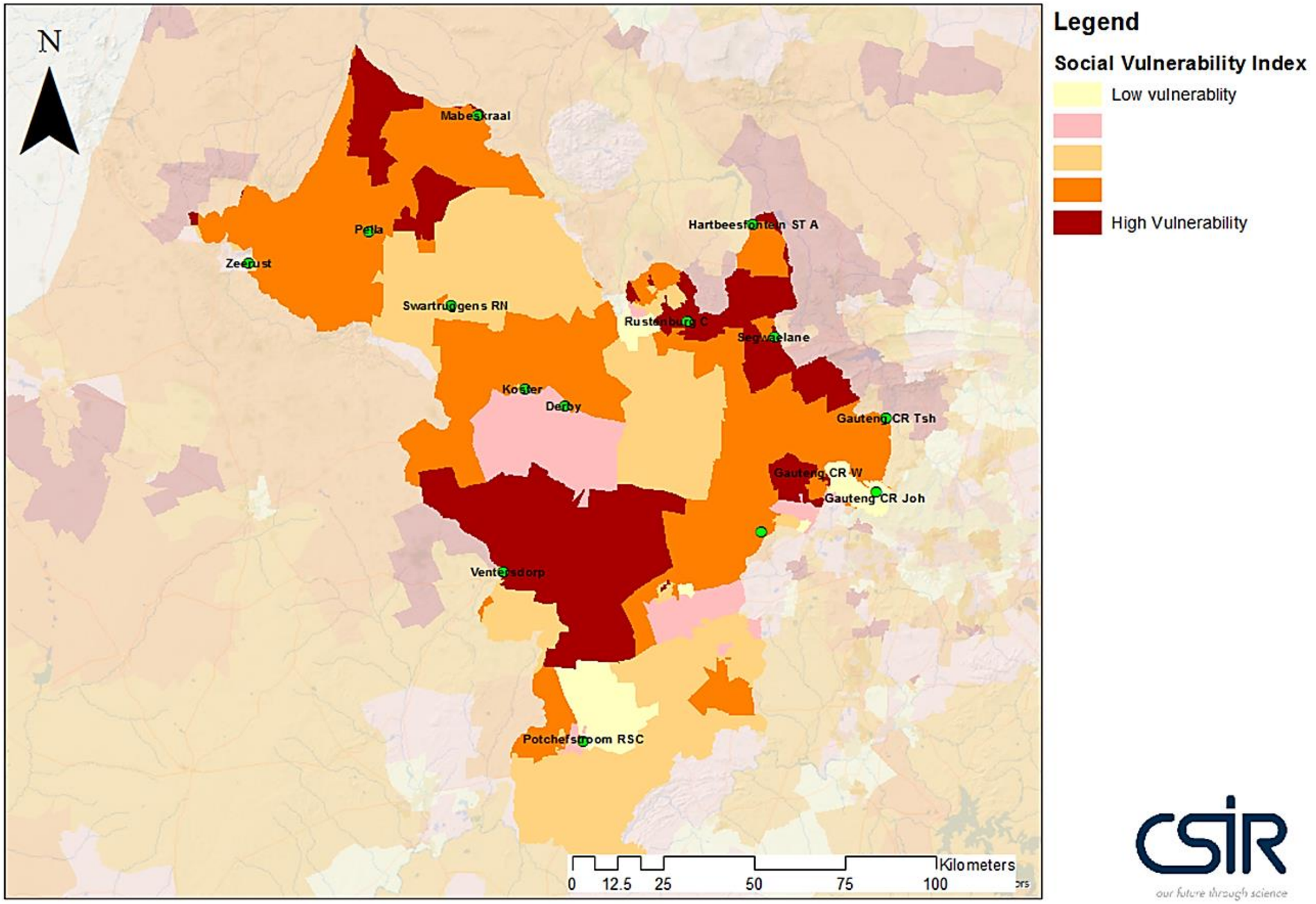

Figure 3.5-10: Social vulnerability of the Gauteng – North West Freshwater Study Area

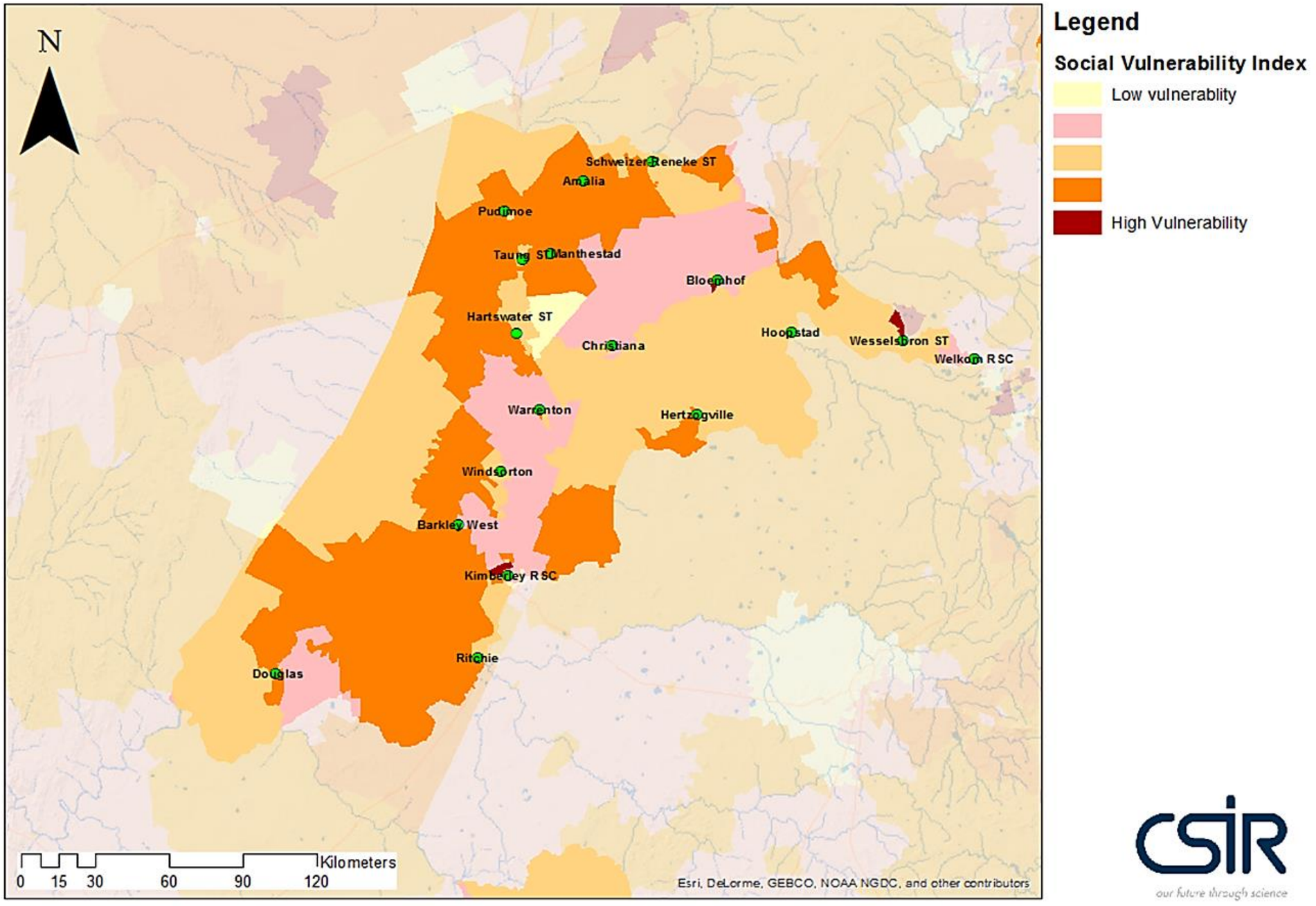

Figure 3.5-11: Social vulnerability of the Vaalharts Freshwater Study Area

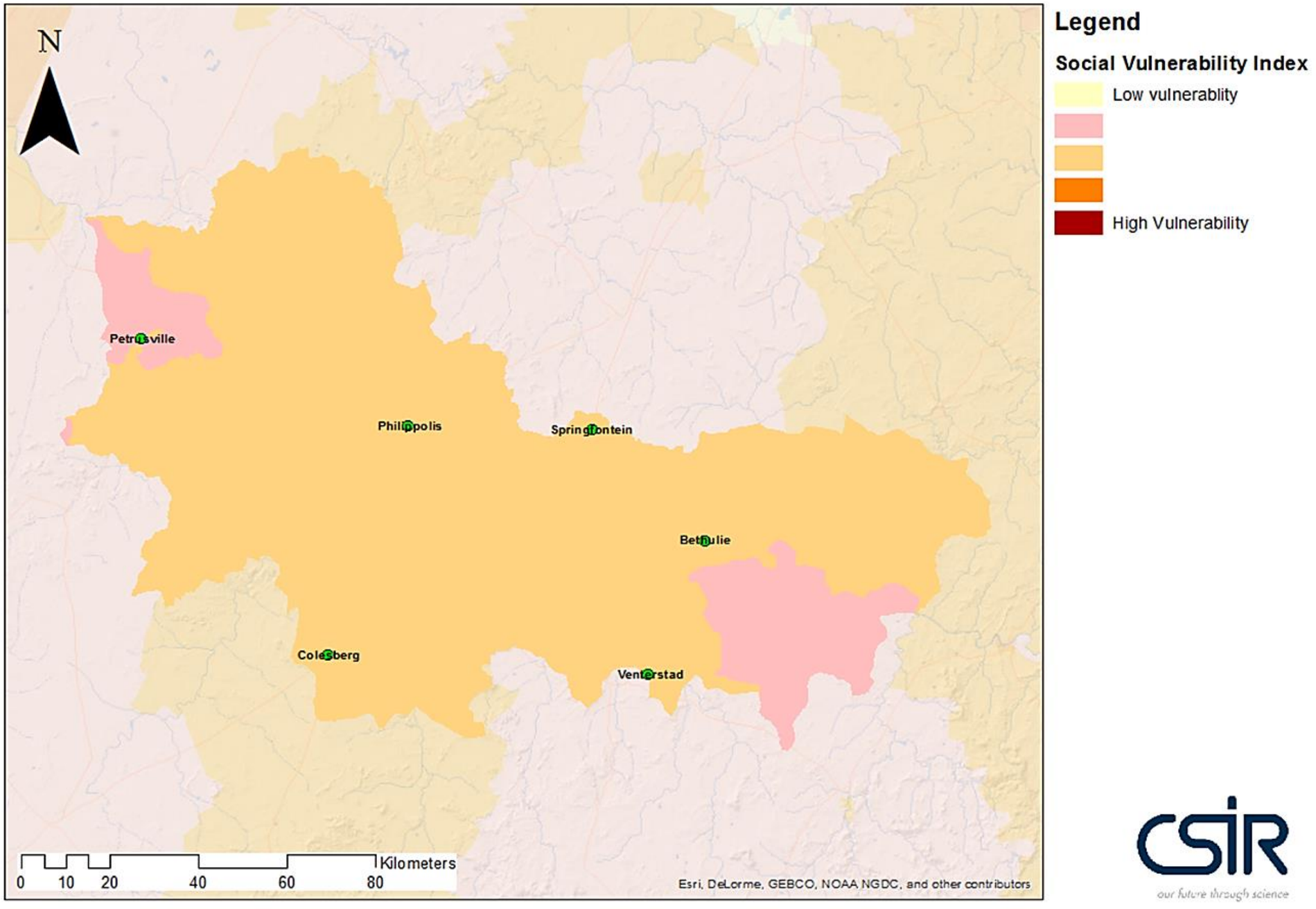

Figure 3.5-12: Social vulnerability of the Vanderkloof – Gariep Freshwater Study Area

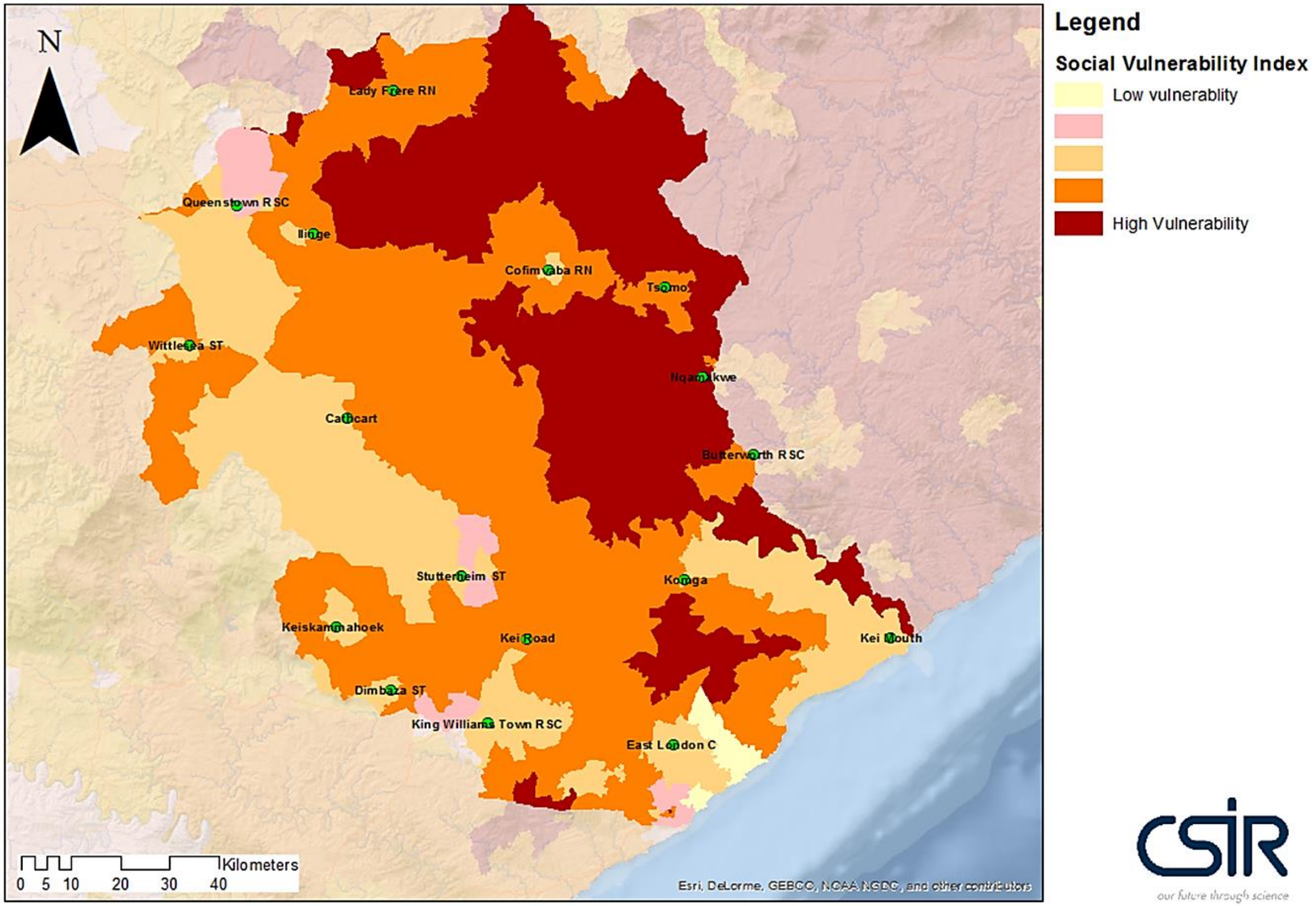

Figure 3.5-13: Social vulnerability of the Eastern Cape Freshwater Study Area

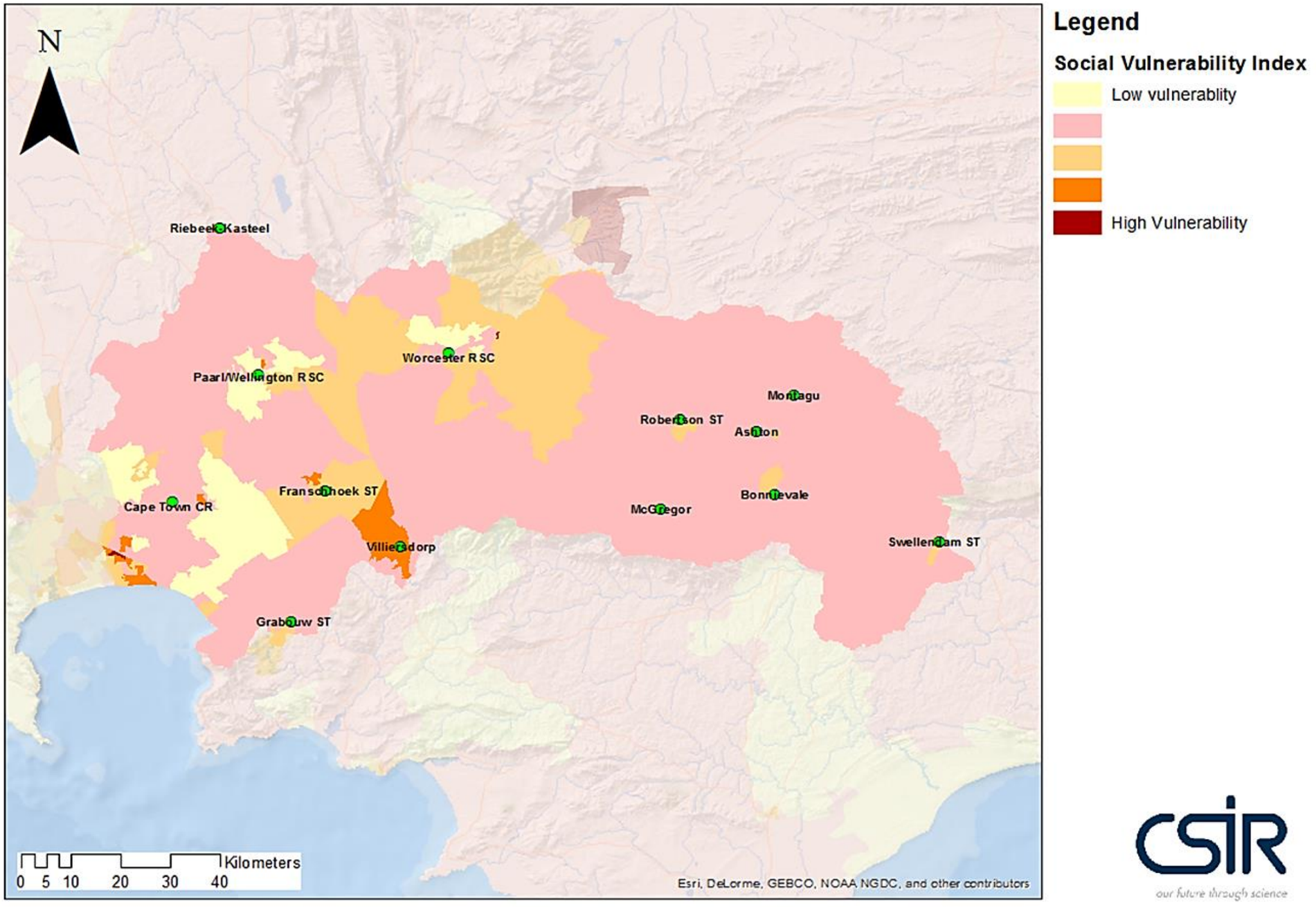

Figure 3.5-14: Social vulnerability of the Western Cape Freshwater Study Area

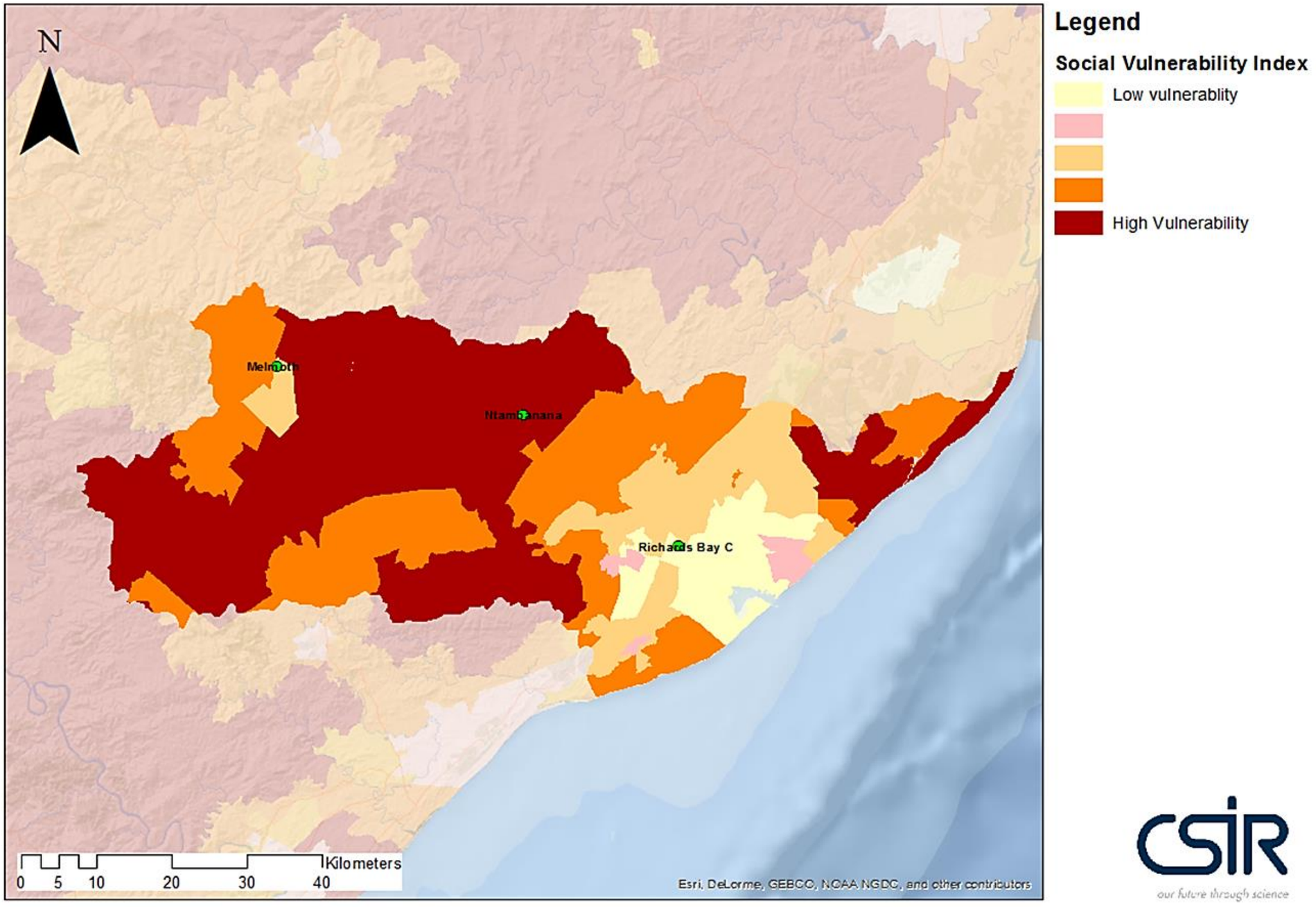

Figure 3.5-15: Social vulnerability of the Richard Bay Freshwater Study Area

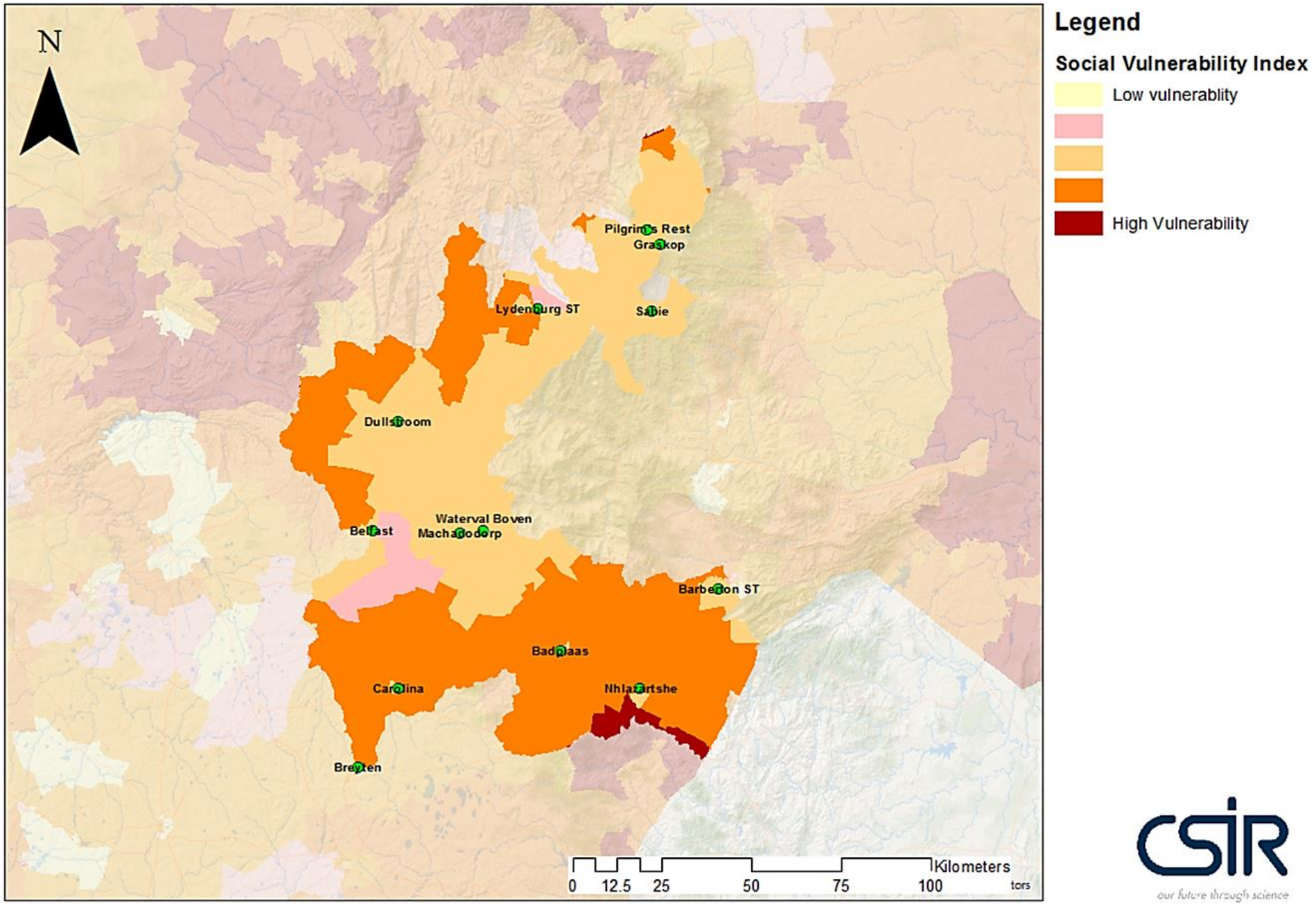

Figure 3.5-16: Social vulnerability of Mpumalanga Freshwater Study Area

3.5.4 Risk Assessment[3]

A key socio-economic risk posed by **freshwater aquaculture** is the displacement of existing dam users. The establishment of dam resource management plans (RMPs) is a crucial mitigation measure to reduce this risk (Figure 3.5-17).

The **risk of adverse effects to human health** due to exposure to contaminated aquaculture products are high, but can mitigated through effective management and monitoring of animal health (Figure 3.5-17).

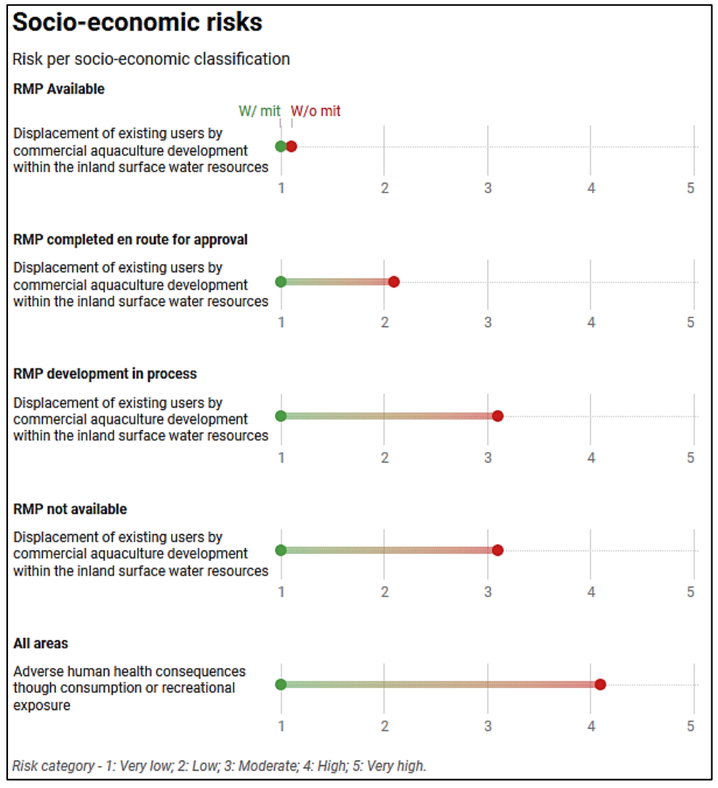

Figure 3.5-17: Summary of the socio-economic risks of marine and freshwater aquaculture. Risks are presented per heritage sensitivity region, without enhancement ("W/o mit") and with opportunity maximization ("W/ mit").

The **opportunities of marine and freshwater aquaculture to contribute to macro-economics, local livelihoods and employment** are most pronounced in regions that are currently less established in terms of economic productivity and social wellbeing (Figure 3.5-18).

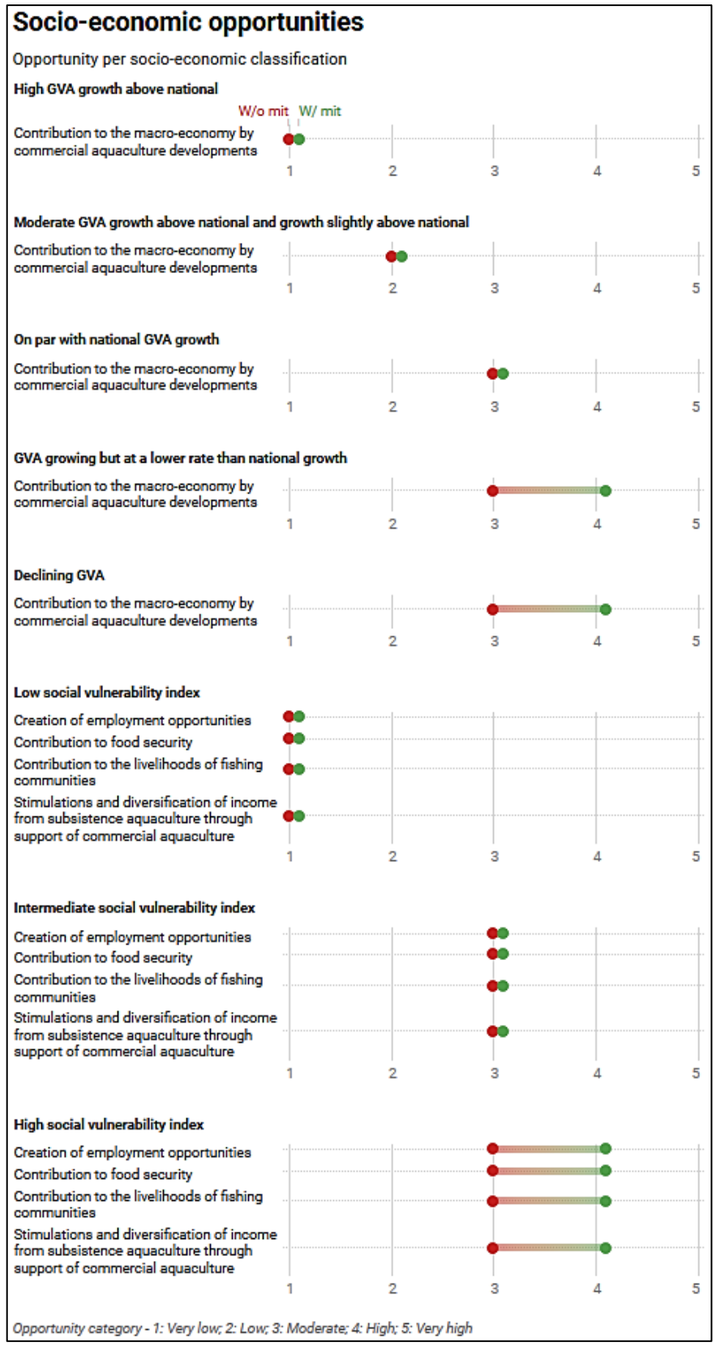

Figure 3.5-18: Summary of the socio-economic opportunities of marine and freshwater aquaculture. Risks are presented per heritage sensitivity region, without enhancement ("W/o mit") and with opportunity maximisation ("W/ mit"). [GVA: Gross Value Added].

[3] The green dots indicate risk after mitigation, but does not imply that risk has been mitigated to acceptable levels. The position of the green dot indicates the risk class after mitigation, which may be high, even with mitigation.

3.5.5 Management Actions, Best Practice Guidelines and Monitoring Requirements

Developmental Stage	Best Practice Guidelines and Monitoring Requirements for the Management of Social and Economic Risks and Opportunities
Planning and Construction phase	**Contribution to the macro-economy by commercial aquaculture developments** • Establish and manage funding initiatives. • Promote and incentivise a broader value chain perspective. • Develop policies that enable economic growth within the aquaculture sector. • Undertake feasibility assessments to determine the viability of a commercial aquaculture development. **Employment opportunities** • The local socio-economic context should be understood (understand factors such as ability and availability of the labour market) as well as determining the willingness and capability of individuals within the study areas to consider a livelihood through aquaculture. • A skills database within the region of the aquaculture project can be compiled. This will ensure that the transferability of human skills and training needs are taken into account when employing residents form the region. • A community's expectation regarding employment opportunities should be managed through social risk communication. Especially where there is an expectation of high employment opportunities, which may not be the case. The aim of the social risk communication method is to ensure that the communicator, in this case the aquaculture developer or government, are open about risks, in this case, specifically regarding employment opportunities. This will manage expectations and reduce social conflict. **Provision of food security** • Ensure that policies are developed and updated, when required, to support the objectives to promote food security thorough aquaculture. **Altered livelihoods of fishing communities** • The socio-economic drivers that influence human behaviour and vulnerability must be considered in a context-specific setting. To achieve this, all affected stakeholders must be part of the decision-making and policy development process. • Small-scale fishing rights and practices must be recognised in governance arrangements. • A socio-economic analysis of each area must be undertaken in order to understand the context in which the proposed aquaculture projects will be undertaken. • In the coastal communities where there are small scale fisheries, it is important to understand the mechanisms through which these fisheries participate in poverty alleviation and socio-economic advancement. **The role of commercial aquaculture in supporting subsistence aquaculture** • Establish the necessary policies, initiatives and plans to support subsistence aquaculture and efforts of integrating existing agriculture practices into commercial aquaculture developments, potentially via subsidies. • Planning associated with the funding initiative must focused on how to build financial independence and commercial viability instead of social projects that continuously require financial support. • Support subsistence aquaculture through the involvement of the private sector via Community Public Private Partnerships (CPPPs). The CPPP model combines assets unique to each sector to ensure the viability of a project. **User conflict** • Ensure all dams to be utilised for aquaculture have a Resource Management Plan (RMP) which guides development and uses of the dams. These RMPs must also include mechanisms to manage user conflict through community forums and proper governance. • Proper consideration of other users utilising the CPR must be undertaken through appropriate planning interventions and policy guidelines to direct aquaculture development into appropriate areas. This includes local-planning tools and the Environmental Impact Assessment process. • Incorporate aquaculture development and associated objectives into local planning tools such as the Integrated Development Plan and Spatial Development Plan developed every five (5) years.
Operational phase	**Contribution to the macro-economy by commercial aquaculture developments** • Where production occurs, further processing and associated activities should occur within the town or area where the aquaculture development occurs. • Social responsibility programmes run by aquaculture industries can also promote skills development and improve livelihoods in the local communities. **Provision of food security** • Shift away from a sectoral approach to a holistic approach whereby local communities and other relevant stakeholders are enabled to participate in the aquaculture development. **Human health** • Each aquaculture development is required to adhere to the relevant applicable South African legislation, guidelines and frameworks governing human health and food safety. • Each aquaculture development is required to adhere to the permit conditions, and the Shellfish and Fish monitoring control programmes prescribed by DEFF (previously DAFF).