



# Understanding drivers of fishing pressure in South Africa's Western Cape: insights from the development of a synthetic set of social indicators



Louise C. Gammage, Astrid Jarre & Zannè Zeeman - du Toit

Department of Biological Sciences & Marine and Antarctic Research Centre for Innovation and Sustainability (MARIS); University of Cape Town, Rondebosch, South Africa (louise.gammage@uct.ac.za)



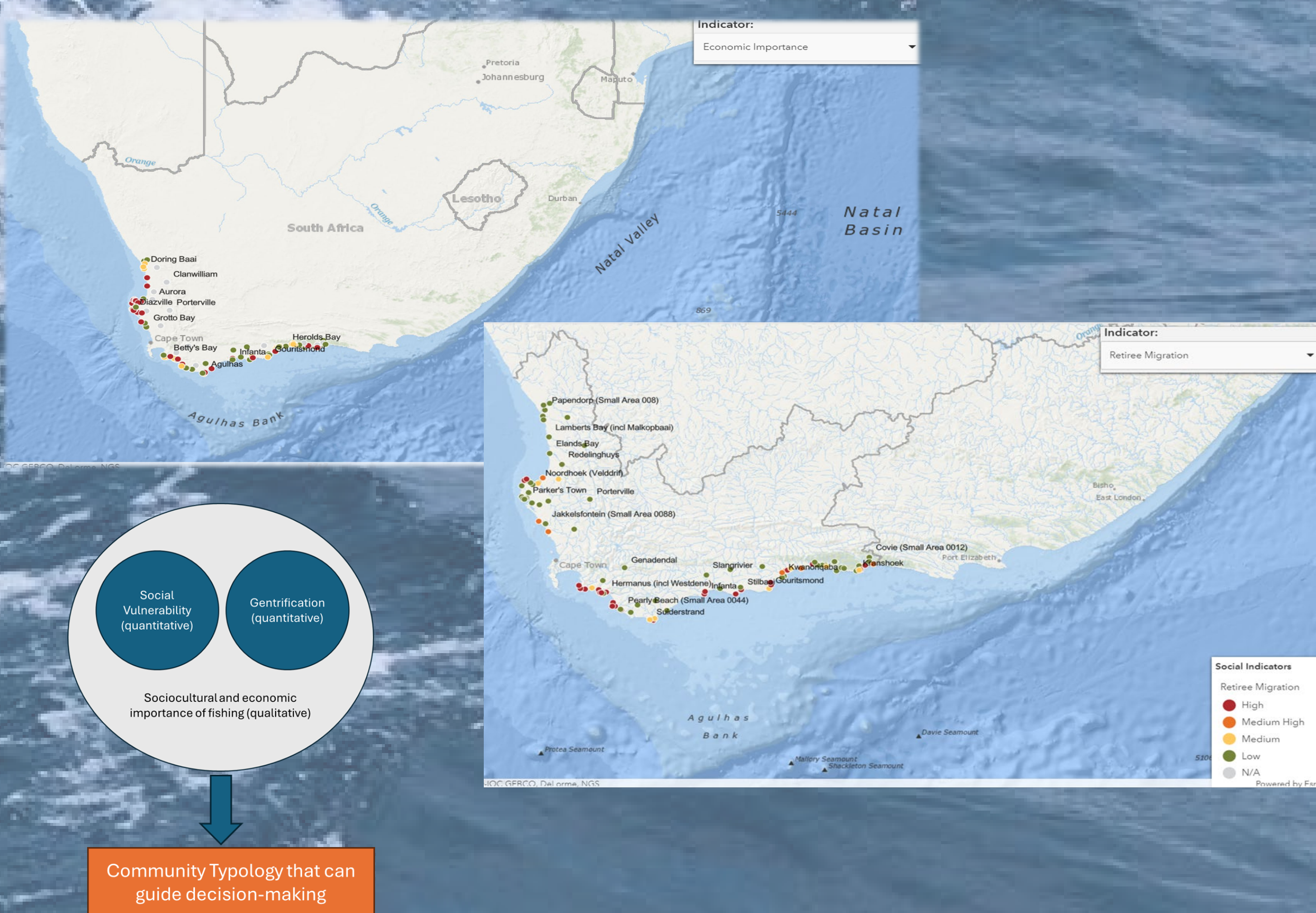
## Background & Objectives

- Fishing, to date, remains the most critical anthropogenic pressure in the southern Benguela
- Understanding drivers of fishing** is important for management for improved (full-spectrum) sustainability
- Incorporating social-system components into formal decision-making has proven to be a challenge
- Approach championed by NOAA Fisheries (USA): Integrated ecosystem assessments
- We worked in collaboration with NOAA colleagues, building on their approach to **ensure comparability around the Atlantic**
- Social wellbeing and vulnerability indices for coastal (fishing) communities** - synthetic model, 2nd prototype

## Methodological approach

- Identified communities based on fishing rights allocation lists – importantly, **communities of fishers** as opposed to fishing communities (Ward et al. 2022, Zeeman et al. in prep.)
- 110 rural and peri-urban communities** identified from the west (39), southwest (28) and south (43) coasts of the western Cape
- Definition of coastal regions in line with administrative and, notably, **biogeographical areas**.
- Currently adding **197 communities from the Cape Town Metro** to the analyses
- Social data from the **2011 South African Census**, data from subsequent censuses will be straightforward to include to create
- Quantitative indicators: Correlation matrix, followed by **principal component factor analysis yielding single-factor solution** with a minimum of 45% variance explained
- Converted to index by transforming to **fraction of standard deviation** around the mean, for each indicator
- Two semi-quantitative indicators related to fishing engagement - **economic reliance and socio-cultural importance** - defined through tick lists of characteristics

## Results



## Adapting NOAA's approach

### Fishing Communities

- Defining the community is crucial. South African indicators use 'communities of fishers' to capture the smallest scales of operation and ensure marginalised groups are well-represented.
- Communities of fishers and enumeration areas don't always match.

### Reconceptualising while ensuring comparability

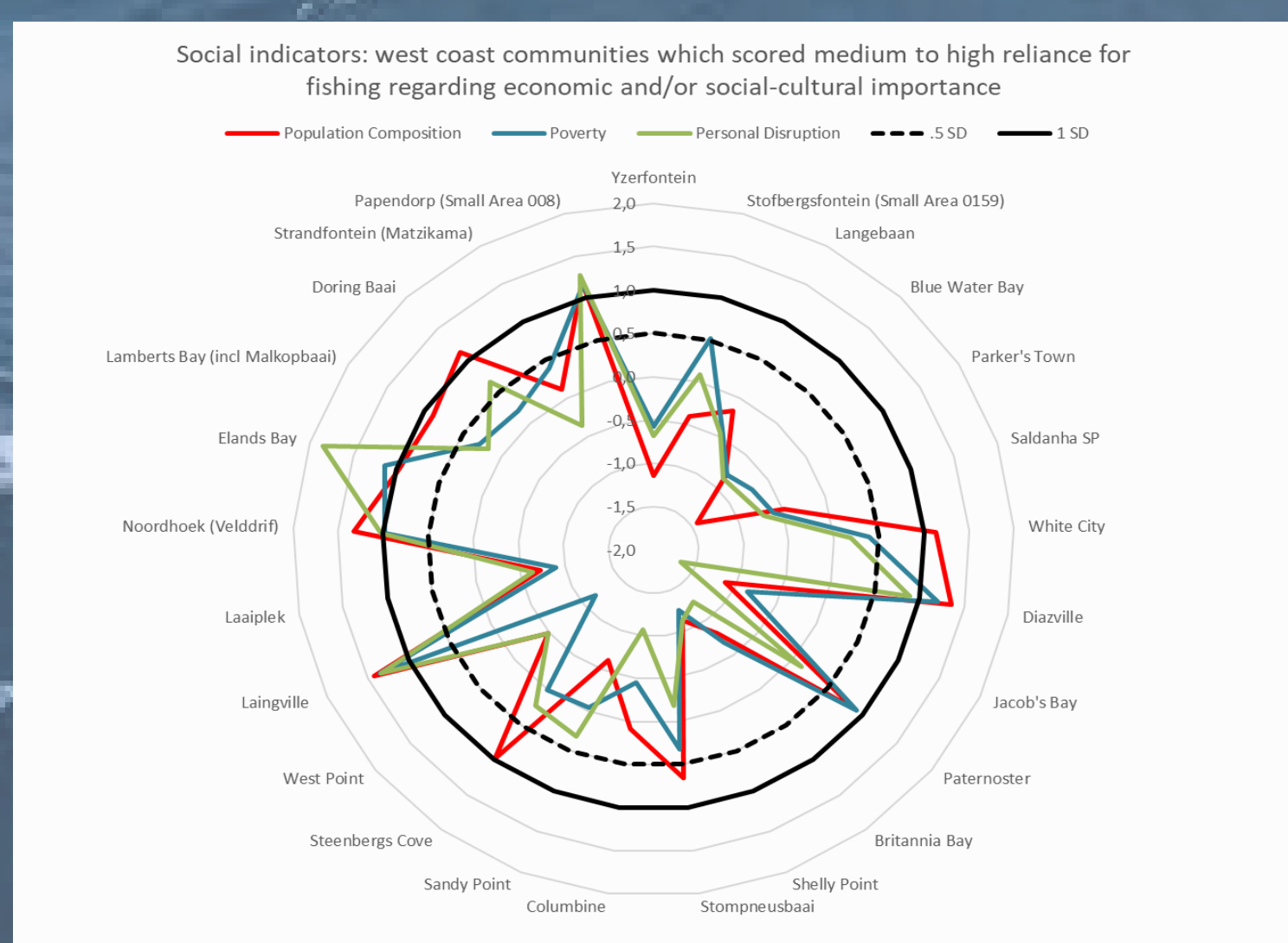
- Context informs the conceptualisation of variables—variables reframed for the South African context (including insights regarding the drivers of poverty in South Africa from the multidimensional poverty indices). There remains enough similarity in the conceptualisation of the variables to allow for meaningful comparison).

### Available Data

- Census data used here is old (2011); enumeration areas are not always consistent, skews data in 'small-areas', hope to add 2023 data when available
- Data gaps: fine-scale labour, social grants, fisheries (not provided on request) and climate change (at fine scales).

## Insights & Next steps

- Method important for the toolbox of approaches that can aid decision-making in marine systems
- Index variables identify **key drivers at a fine scale**
- Indices reveal community needs.** Assessing their intersection with ecosystem model output (ecosystem health and state) will help to clarify links between fishing, resource availability, and ecological health ∴ **targeted management strategies**
- Explore additional indicators linked to **climate risk, at this fine scale**
- Use for **Atlantic Basin-wide comparisons** – crucial due to the interconnectedness of Atlantic SESs

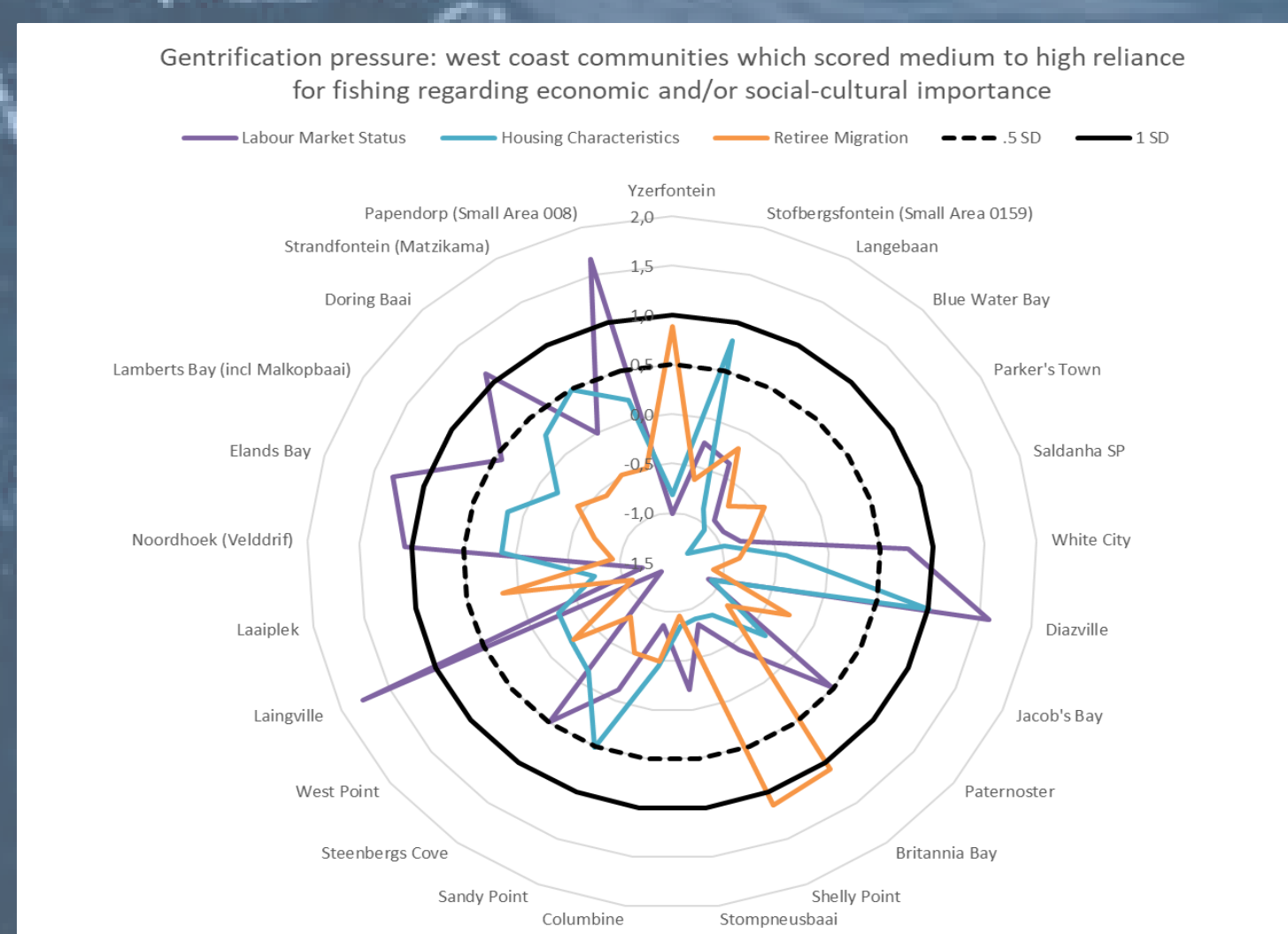


Indicators of Social vulnerability (narrowly defined)

Index Variable
<b>a. Personal Disruption Index</b>
Per cent head of households 64 years and younger with annual income under UBPL
Per cent unemployed, per cent discouraged work seekers (combined)
Level of education: no schooling
Health: Disability. Percentage of population that has one or more disabilities
<b>b. Population Composition Index</b>
Population group: % White alone
Population age under five years (%) (0-4)
The first language is spoken in the Household -English only
Percent Female-headed households
<b>c. Poverty Index</b>
Poverty: % households with annual household income equal to or less than the poverty line (incl. extreme, LBPL and UBPL)
Dependence on social assistance (child, old-age, disability, etc. grants)
Families living below UBPL: % 64 years & younger and in poverty (families with a head of the household of 'working' age)
Families living below UBPL: Percentage 65 years & older and in poverty (families with a head of household who is retired)

Indicators of Gentrification

Index Variable
<b>a. Labour Market Status</b>
Per cent head of households 64 years and younger with annual income under UBPL
Youth unemployment - persons 15 years and older & 35 years and younger - unemployed or discouraged work-seeker
Per cent head of households 65 years and older with annual income under UBPL
Percentage of female-headed households
<b>b. Housing Characteristics Index</b>
Access to Amenities: Piped water inside the dwelling
Percentage Informal dwellings
Access to Amenities: Electricity for lighting
Tenure status: Homeowner (rent-free housing)
Tenure status: Homeowner (bond)
<b>c. Retiree Migration</b>
Per cent of households with head 65 years and older
Labour market status (65 years & older and not working) (retirement age)
Per cent of households with head 65 years and older, receiving annual income that is more than SASSA old-age grant per annum



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References  
 Gammage LC, Jarre A, Colburn LL, Clay PM. In Prep. Future-proofing South African fisheries: Indicators for improved decision-making in fast-changing systems. ICES Journal of Marine Science.  
 Gammage LC, Jarre A, Jarre, IC, Ward CD. 2023. Understanding drivers of fishing pressure in South Africa's Western Cape: Development of a first set of social vulnerability indicators for comparability around the Atlantic Ocean. University of Cape Town. Report: <https://doi.org/10.25375/uct.24376036.v1>  
 Ward CD, Gammage LC, Jarre A. 2022. Community Profiles for Western Cape marine fisheries. University of Cape Town. Report: <https://doi.org/10.25375/uct.19383602.v1>