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STATE OF ENVIRONMENT OUTLOOK REPORT FOR THE WESTERN CAPE PROVINCE

EXECUTIVE SUMMARY

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Project Team: Western Cape Government Environmental Affairs and Development Planning
Karen Shippey, Ronald Mukanya and Francini van Staden

Project Team: SRK Consulting
Christopher Dalgliesh, Sharon Jones, Jessica du Toit, Masi Fubesi (GIS) and Keagan Allan (GIS)

Chapter	Principal authors	Acknowledgements
Introduction	Sharon Jones and Jessica du Toit	Department of Environmental Affairs and Development Planning (DEA&DP): Karen Shippey, Ronald Mukanya, Francini van Staden
Drivers and Pressures	Sharon Jones and Jessica du Toit	DEA&DP: Karen Shippey, Ronald Mukanya, Francini van Staden
Land	Victoria Braham and Aphiwe-Zona Dotwana	Department of Agriculture: Dr Ilse Trautmann and Francis Steyn DEA&DP: Frances van der Merwe, Sarah Birch, Marek Kedzieja, Helena Jacobs , Jeff Jefferson Other: Jan Coetzee (WWF), Anneliza Collett (DAFF)
Biodiversity and Ecosystem Health	Warrick Stewart	DEA&DP: Albert Ackhurst, Frances van der Merwe, Lize Jennings-Boom CapeNature: Genevieve Pence, Andrew Turner, Dean Impson Other: Lydia Cape (CSIR), Nicky Allsopp (SAEON)
Inland Water	Xanthe Adams, Sharon Jones, Daniell du Preez	DEA&DP: Catherine Bill, Marlé Kunneke, Sarah Birch, Frances van der Merwe, Lize Jennings-Boom Department of Water and Sanitation:: Melissa Lintnaar-Strauss, Andrew Gordon City of Cape Town (CCT): Candice Haskins Other: David L' Maitre (CSIR), Kate Snaddon (Freshwater Consulting Group), Edward Molteno (Kogelberg Nature Reserve)
Oceans and Coasts	Sharon Jones	DEA&DP: Marlene Laros, Caren George, Andre van der Merwe, Sarah Birch, Frances van der Merwe, Nyanisa Tshaya EoH Coastal and Environmental Services: Thomas King, Greer Hawley, Amy Hunter Other: Pierre de Villiers (CapeNature), Lara van Niekerk (CSIR)

Chapter	Principal authors	Acknowledgements
Human Settlements	Victoria Braham and Aphiwe-Zona Dotwana	DEA&DP: Helena Jacobs, Frances van der Merwe, Jeff Jefferson Western Cape Department of Human Settlements: David Alli, Eugene Visagie, Anthony Hazell CCT Transport and Urban Development Authority: Nicky Sasman
Air Quality	Andrea Davidson and Dhiren Naidoo	DEA&DP: Karen Shippey, Dr Joy Leaner, Bhawoodien Parker, Lize Jennings-Boom, Sally Benson, Gavaza Mhlarhi, Portia Rululu, Claudia Frazenburg, Xenthia Smith, Jeff Jefferson, Helena Jacobs
Climate Change	Paul Jorgensen	DEA&DP: Lize Jennings-Boom, Frances van der Merwe, Francini van Staden Department of Agriculture: Stephanie Midgley CCT: Hilary Price, Lizanda van Rensburg, Amy Davison Other: Dr Christie Godsmark and Prof Hanna-Andrea Rother (University of Cape Town School of Public Health and Family Medicine)
Energy	Jessica du Toit and Sharon Jones	DEA&DP: Lize Jennings-Boom, Frances van der Merwe Department of Energy: Ramaano Nembahe Department of Public Works: Michelle Britton Western Cape Department of Economic Development and Tourism: Ajay Trikam, Helen Davies CCT: Hilary Price, Lizanda van Rensburg, Sarah Ward Other: Bryce McCall (UCT), Fadiel Ahjum (UCT), Bruce Raw (GreenCape), Jonathan Aronson (South African Bat Assessment Advisory Panel), Luanita Snyman-van der Walt (CSIR), Mike Young (Private)
Waste Management	Lindsay Shand	DEA&DP: Lance McBain-Charles, Eddie Hanekom, Belinda Langenhoven, Helena Jacobs, Jeff Jefferson, Lize Jennings-Boom Other: Francois Kotze (Overberg District Municipality)
Outlook	Jessica du Toit and Sharon Jones	DEA&DP: Karen Shippey, Ronald Mukanya, Francini van Staden

1 INTRODUCTION

The Western Cape is blessed with picturesque mountain ranges, shorelines and a unique vegetation type known as fynbos, which is world renowned for its high levels of biodiversity and endemism (Manning, 2008). In addition to its natural beauty, the Western Cape is home to a culturally diverse population with a long and rich history. However, the province's natural resources are impacted by a range of factors, including economic development, societal conditions and climate change. To enable decision-making that balances the needs of human and natural systems and to achieve a sustainable future, regular environmental assessment in the form of "state of the environment" reporting is required.

State of Environment Reporting

The State of Environment Outlook report provides an update on the province's environmental conditions and records efforts to *respond* to environmental change, by influencing and guiding policy development and decision making in the Western Cape. Stakeholders are provided with an analysis of trends within the province, and an indication of the successes or failures of efforts to transition towards a more sustainable and resilient environment.

Figure 1: The Sustainable Development Goals

South Africa has produced a range of State of Environment products, including three national outlook reports. This 2018 report is the third comprehensive report on environmental trends in the Western Cape and retains the nine themes included in the 2013 report. For the review period 2014 – 2017, specific emerging trends have also been reported. The aim of this report is to describe the current state of environmental resources and identify environmental trends and priority concerns. It must therefore be seen as a critical supportive process for the Western Cape's "OneCape 2040". OneCape 2040's vision is to enhance the sustainability of the regional economy by creating: "*...a resilient, inclusive and competitive Western Cape with high rates of employment, growing incomes, greater equality and an improved quality of life for all our citizens and residents that addresses the crisis of joblessness, overcomes our legacy of skills and asset deficits and responds to environmental risk.*" The vision acknowledges the need for a sustainable balance between economic access, cultural diversity, human activities and, importantly, sustained integrity of the delicate ecology of the Western Cape. The themes reported on in this document align with a number of the Sustainable Development Goals (SDGs) (Figure 1), which are a set of 17 "Global Goals" spearheaded by the United Nations that actively contribute to sustainable development and define the 2030 Agenda for Sustainable Development. This report highlights where the province falls short in achieving the SDGs, and recognises these as provincial priorities.

2 STATE OF ENVIRONMENT REPORTING

2.1 The Drivers-Pressures-State-Impact-Response framework

The Western Cape State of Environment Outlook Report (SoEOR) is based on the internationally recognised and commonly accepted Driver - Pressure – State – Impact - Response (DPSIR) framework. The Department of Environmental Affairs (DEA) Draft Notice for compiling a SoEOR prescribes the DPSIR format in every provincial SoEOR. As illustrated in Figure 2, the DPSIR components represent a cyclical process of causal links. Each component can be traced back to its precursor, and also to its effect in the overall scheme. Societal responses have the potential to affect all other components of the framework.

- **'Drivers'** are the primary agents driving change in the environment (e.g. human population).
- **'Pressures'** are the human activities and processes that act on the environment and cause environmental change (e.g. agricultural production).

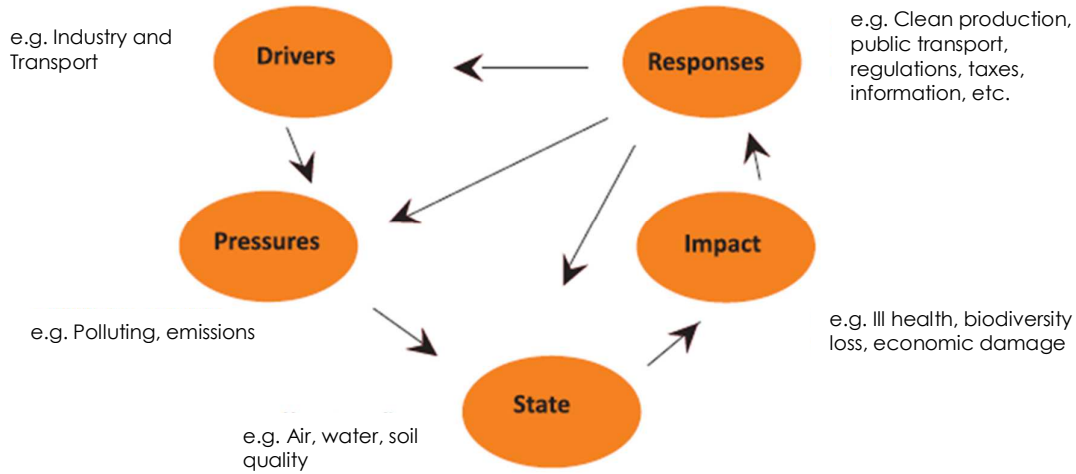

Figure 2: The DPSIR Framework

- **State'** describes the current condition of the environment which changes over time (e.g. extent of cultivation).
- **'Impacts'** describe the consequences of changes (positive / negative) to the environmental state from a sustainability viewpoint – considering effects to humans, the economy, ecosystems, other environmental sectors, and could include regional or global effects (e.g. fragmentation of natural habitat).
- **'Responses'** are actions (corrective or survival responses) taken to influence drivers and pressures, or to change the state, including easing or preventing negative environmental impacts, correcting damage, or conserving natural resources (e.g. improved monitoring and compliance within extension services). Societal responses act as inputs to all components of the framework.

3 DRIVERS OF CHANGE IN THE WESTERN CAPE

The environment that we live in is in a constant state of change. Humans introduce elements and forces (shocks) into natural systems that compromise their function and sustainability. These forces are defined as either drivers or pressures in State of Environment reporting.

Drivers determine the extent to which human activity influences the environment either positively or negatively. Pressures, on the other hand, refer to actual activities or interaction between humans and the environment that affect the state of environmental variables directly. The key drivers and pressures in the Western Cape are described below.

3.1 Socio-economic

Approximately six and a half million people reside in the Western Cape, and this number is increasing constantly (WCG, 2016). The influx of people, into urban areas in particular, alters lifestyles and increases consumption, putting strain on service delivery backlogs, the availability of living space and transportation systems. The influx of people into urban areas has wider implications for planning and is a key demand side pressure in the province.

The level of inequality in the Western Cape is high. Income inequality and poverty are directly correlated with health and social problems, and environmental degradation, which is inversely correlated with environmental sustainability. It is recognised that the higher the income inequality the worse the performance against environmental indicators such as waste reduction, water use, biodiversity loss, as well as composite environmental indices such as the ecological footprint. The persistence of informal settlements with poor living conditions has a significant impact on the environment and the lack of access to basic services (electricity, water, sanitation and refuse removal) leads to illegal dumping, waste disposed in rivers and burning of waste causing land, water and air pollution.

A legacy of spatial segregation and displacement of people has resulted in the unequal distribution of the Western Cape's land resources. With this has come the entrenchment of unsustainable land practices, which have contributed significantly to the degradation of land in the province (DEA&DP, 2013).

3.2 Biological

Biological drivers of change in the Western Cape include climate change, fires and altered fire regimes and invasive alien species.

The Western Cape is particularly vulnerable to climate change, and the region is highly dependent on water storage capacity due to the dominant winter rainfall patterns (DEA&DP, 2017b). Climate change is projected to increase average temperatures and possibly lower annual rainfall in the Western Cape (DEA&DP, 2014).

Veld fires in the Western Cape occur naturally during the dry windy summer months, when temperatures rise and vegetation tends to dry out. The size, intensity and occurrence of veld fires depend on weather conditions, the composition of the vegetation (e.g. moisture content, volatile oils, percentage of moribund materials), and available fuel load. Major natural fires have occurred recently (2017) in the Eden District, City of Cape Town (CCT) and the Cape Winelands areas. The increased frequency of fires is strongly linked to climate change. Apart from damage to property, veld fires affect air and water quality and can lead to a decline in species if they occur too frequently or too infrequently.

Invasive alien species present an array of challenges including higher levels of surface and ground water uptake (reducing water availability), increased fire risk, competition with indigenous species leading to habitat loss, and increased erosion of topsoil. Despite massive efforts by CapeNature and the Working for Water, Working for Wetlands, and Working for the Coast programmes to control alien plants, they remain a widespread problem in the Western Cape.

3.3 Anthropogenic (Man-made)

Most renewable natural resources have levels of regeneration which, if overexploited, will lead to depletion. The increasing population of the Western Cape exerts pressures on the natural environment, through over-exploitation of resources (e.g. water, agricultural products, living space, and other ecosystem goods and services), pollution, damage to marine resources, cultivation agriculture and mining.

Pollution is a typical consequence of the concentration of humans. Human activity generates waste as by-products of resource extraction, materials processing, goods transportation and consumption, and ultimately through the disposal of waste products. This accumulation of waste tends to affect the state of the environment if accumulation exceeds the rate at which natural systems can assimilate and break down the contaminants. Causes of pollution in the Western Cape include agriculture (pollution of freshwater resources by pesticides and fertiliser), industry (air pollution), lack of access to sanitation (use of water resources for bathing and ablutions), illegal dumping and improper disposal of waste. As in many coastal areas, human activity in the Western Cape tends to concentrate along the coastline, inevitably placing strain on marine resources and ecosystems. Along with the significant land use change through urbanisation or physical development, coastal activities tend to exploit resources at or above their rates of replenishment and may cause excessive pollution and disturbance of the natural equilibrium.

The agriculture sector in the Western Cape is reported to be growing and, as a resource-intensive sector, the pressure it places on the environment is noteworthy, largely due to certain unsustainable farming methods. These include use of chemical pesticides (which contaminate water resources and reduce biodiversity), tillage (which is a leading cause of soil degradation) and burning of fossil fuels on farms (which contributes to air pollution and carbon emissions) (GreenCape, 2016).

Mining in the Western Cape is comparatively insignificant compared to the rest of the country; however notable mineral deposits along the West Coast do exert pressure on resources in the province. Sand mining, in particular, is becoming more prevalent in the West Coast landscape, including illegal sand mines.

3.4 Governance

Governance refers to the practice of using authoritative structures to determine strategic direction and regulate society. Good governance will involve governmental and non-governmental partners creating an economically and environmentally sustainable social and developmental state. It follows that environmental governance, as a subset, entails the responsible management of environmental assets and resources on behalf of society (DEA&DP, 2013).

Policies, strategies and regulatory controls formulated and implemented by governance structures determine much of how societies operate, and consequently influence the pressures on the natural environment. Importantly, this influence extends to many aspects of governance that are not necessarily directly related to environmental aspects. It is therefore important to recognise governance in State of Environment Outlook reporting as a key determinant of environmental change and government responses (DEA&DP, 2013).

4 ENVIRONMENTAL THEMES

Environmental systems in the Western Cape might be unique in terms of composition, but nevertheless, are just a small component of global systems and processes. They are a subset of all the major hydrological, atmospheric and nutrient cycles, and are inextricably related to its neighbouring provinces, the rest of South Africa, as well as regional oceanic and atmospheric circulations.

Impacts such as climate change, biodiversity loss, consumption of fresh water, change in land uses and air pollution have global implications. Triggering "tipping points", which cascade systematic adjustments within the Earth's natural systems will necessitate drastic changes to our current way of life. Figure 3 shows a way of thinking about sustainability that takes our planet's finite resources into consideration. Human activities must respect the processing capacity of earth's natural systems. At the same time, we strive to meet basic human needs - the "social foundation" - to ensure quality of life to all. Sustainability is about finding a way to remain within the environmental ceiling whilst meeting social foundation requirements. Many studies contend that we have already exceeded the environmental ceiling for climate change, nitrogen cycle, land conversion and biodiversity loss on a global scale.

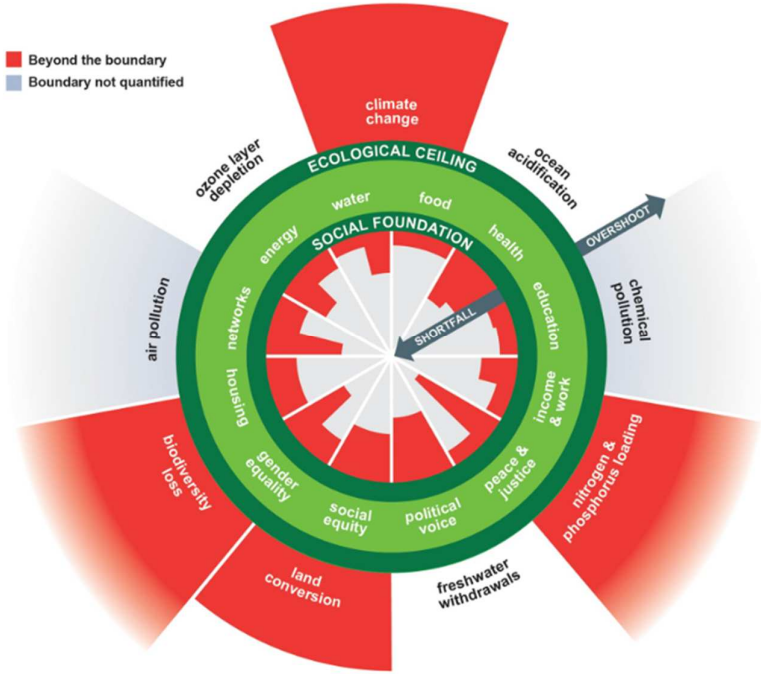

Figure 3: Global performance in terms of environmental planetary boundaries (Raworth, 2017)

The following sections describe the state of each of the environmental themes. The status of the different themes should be regarded as a measure of how well we are doing in terms of keeping human activities within the bounds of the "safe and just space" of sustainability.

Themes and indicators

In order to consider the state of the environment as a whole and its constituent systems, reporting is done according to a number of summarising themes. This report follows a similar structure to the 2013 report, reflecting on themes related to natural, social and economic aspects of sustainable development. The report consists of nine themes, consistent with other State of Environment Reports in South Africa. This Executive Summary reports on the key findings of each theme, whilst the detailed individual theme chapters are available in digital format. Within each theme, issues representative of the overall state or health of that theme are identified. Each issue is then measured according to quantifiable indicators that show change to that facet of the environment. Indicators are the key to environmental reporting as they provide a baseline against which change can be tracked over time. The selection of indicators for the 2018 State of Environment Outlook Report was informed by the indicators in the 2013 report and similar documents, and by consultation with key stakeholders, so as to meet both current and expected future uses of this tool.

4.1 Land

OUTLOOK: INSUFFICIENT DATA BUT APPEARS TO BE DECLINING

Land is a critical resource for mining, agriculture, urban development and transportation, and fundamental to the "sense of place" of the province. The loss of land to agriculture, land degradation, habitat fragmentation and the loss of ecological services all impact on the sustainability of the province, as well as food security, poverty and livelihoods. Land is therefore a critical underpinning for much of the State of Environment Outlook.

The Western Cape comprises 10.6% of the country's total land area and has a highly urbanised population. The growing population, an increasing number of households, and decreasing household sizes all contribute to the pressure on land resources. Between 2011 and 2015 alone, about 150 000 people migrated to the Western Cape. Historical dispossession and forced removal prior to 1994 have resulted in inequitable access to land and resources as well as insecurity of tenure for a large proportion of the population, particularly in agricultural and rural areas.

Land degradation, the reduction or loss of land's biological or economic productivity, is a challenging cycle of bringing human needs in balance with ecosystem capacities. Ultimately, land degradation results in weakening of the human-nature system.

Changes in land use and land cover have substantial impacts on the environment. Land cover in the Western Cape is still mostly classified as natural (65.2%), with most urbanisation and anthropogenic activities occurring along the coast (Figure 4).

Urban zones are concentrated in and around the CCT, Cape Winelands and Mossel Bay. Forestry is common in Eden, the Overberg and, to a lesser extent, in the Cape Winelands.

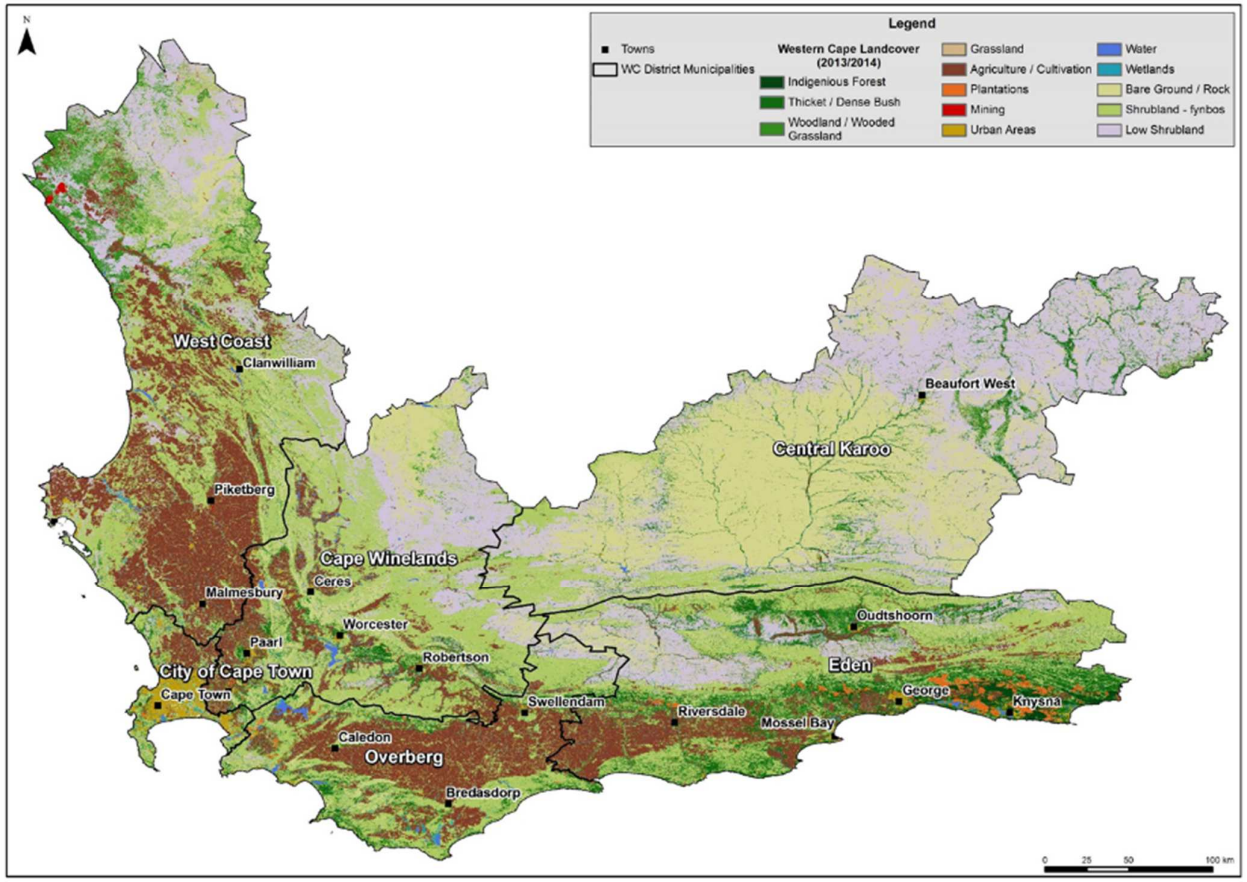

Figure 4: Summarised land cover for the Western Cape

Cape Town is a major drawcard, not only as a tourist destination but also since it is perceived as having a high quality of living, attracting high levels of in- migration. Valuable land that should be used for agriculture and protection of ecological processes is consequently being fragmented and transformed in order to accommodate growth.

The state of land in the Western Cape is ascertained by measuring the three land indicators (see below) and determining how they have changed over time. Ultimately, how land is managed and used determines its underlying state. As was the case in the 2013 SoEOR, land capability and transformation data has not been sufficiently updated to accurately detect trends.

*The State of **Land** in the Western Cape is tracked using the following key **indicators**:*

- *Land Cover*
- *Land Capability*
- *Land Transformation*

Land cover

Land-cover change, which reflects an underlying change in land use, is an indicator for the condition of land and biodiversity. A substantial percentage (33.5%) of the Western Cape's land cover is transformed. Growing pockets of sheet and gully erosion are visible over the central Western Cape, while land degraded by mining is also visible along parts of the West Coast. Improvements are seen in (control of) alien invasive vegetation across the province. However, there are still conspicuous encroachments near human-settlements.

Trends in land cover change are, however, difficult to assess due to data limitations. Three land cover layers are available for South Africa, for1994/5, 2001 (CSIR) and 2009 (SANBI). The data layers cannot be accurately compared, as there are differences in the definitions and number of land cover classes as well as data mapping scales.

Land capability

Land capability is defined as the ability of the soil resource to effectively carry its respective land use (Schoeman *et al.*, 2002). It is a valuable tool in land use planning, and indicates the best use for the land according to capability classes.

Opportunities for agricultural expansion in the Western Cape are limited, as much of the land in the province is unsuitable for cultivation (WWF, 2016) and further restricted by poor access to irrigation water, particularly in the fruit sector. In fact, cultivated land reduced by 3.5% between 2009 and 2014 (SANBI, 2009; GeoTerra Image, 2013/14).

Care should be taken to ensure crops are planted in the appropriate soil (type). Here, the land capability indicator can be used to determine the optimal land use in the province, without compromising or further reducing the capability of the land resource (ARC, 2001).

Land transformation

Land transformation is caused by agricultural activities, urban expansion and degradation and is largely driven by land use. There has been a reported substantial increase in land transformation (the conversion of land, normally from natural habitat to anthropogenic uses) between 2009 and 2014 in the Western Cape. The Central Karoo remains the least transformed district in the province.

However, overall, the Western Cape is still largely natural and untransformed, with the greatest instances of transformation focused in Cape Town and other coastal nodes.

Table 1: Land overview

Aspect	Summary of key points
Pressures	• Urban growth • Agricultural expansion • Climate change • Access to land • Mining • Improved and unsustainable farming methods
Impacts	• Loss of productive land • Loss of future socio-economic opportunities and livelihoods • Improved standard of living and livelihoods, particularly in rural areas • Reduction of natural ecosystems, species and ecological processes
Challenges	• Poor/outdated data relating to land cover change, capability and transformation • Ability to ensure long term, sustainable land use in the Western Cape • Adapting to a climate-changed future
Progress	• Increased application and success of conservation agriculture • Development of key legislation and land use management tools and legislation
Critical areas for action	• Secure appropriate updated, regular data for land cover and change • Consider developing a Western Cape land cover layer as opposed to reliance on the National layer • Continue to support sustainable and conservation agriculture methodologies • Explore alternative means of ensuring the protection of natural areas and the prevention of land degradation specific to land use management

4.2 Biodiversity and Ecosystem Health

OUTLOOK: DECLINING

Biodiversity in the Western Cape is immensely rich at a global scale. Two global biodiversity hotspots, namely the Cape Floristic Region and the Succulent Karoo, are located in the province. These are all *Centres of Endemism*, i.e. sites of global importance based on their high endemism and species richness, and which are under immense pressure from human activities (Mittermeier *et al*., 2004) This richness is primarily due to the estimated 13 489 plant species in the Western Cape, roughly 56% of the floral species in South Africa (Le Roux *et al*., 2012). There are six biomes in the province, namely Fynbos, Succulent Karoo, Nama Karoo, Forest, Albany Thicket and Grassland.

*The state of **biodiversity and ecosystem health** is tracked using the following key **indicators**:*

- *Ecosystem threat status*
- *Ecosystem protection levels*
- *Biodiversity priority areas*
- *Habitat degradation*
- *Species threat status*
- *Invasive alien species*

The extent of biodiversity (original extent of ecosystems) in the province is further reflected by the 174 different ecosystems present, although the presence and distribution of these varies between the districts.

Ecosystem threat status

Ecosystem threat status indicates the degree to which ecosystems are still intact or, conversely, losing vital aspects of their structure, function and composition, on which their ability to provide ecosystem services ultimately depends.

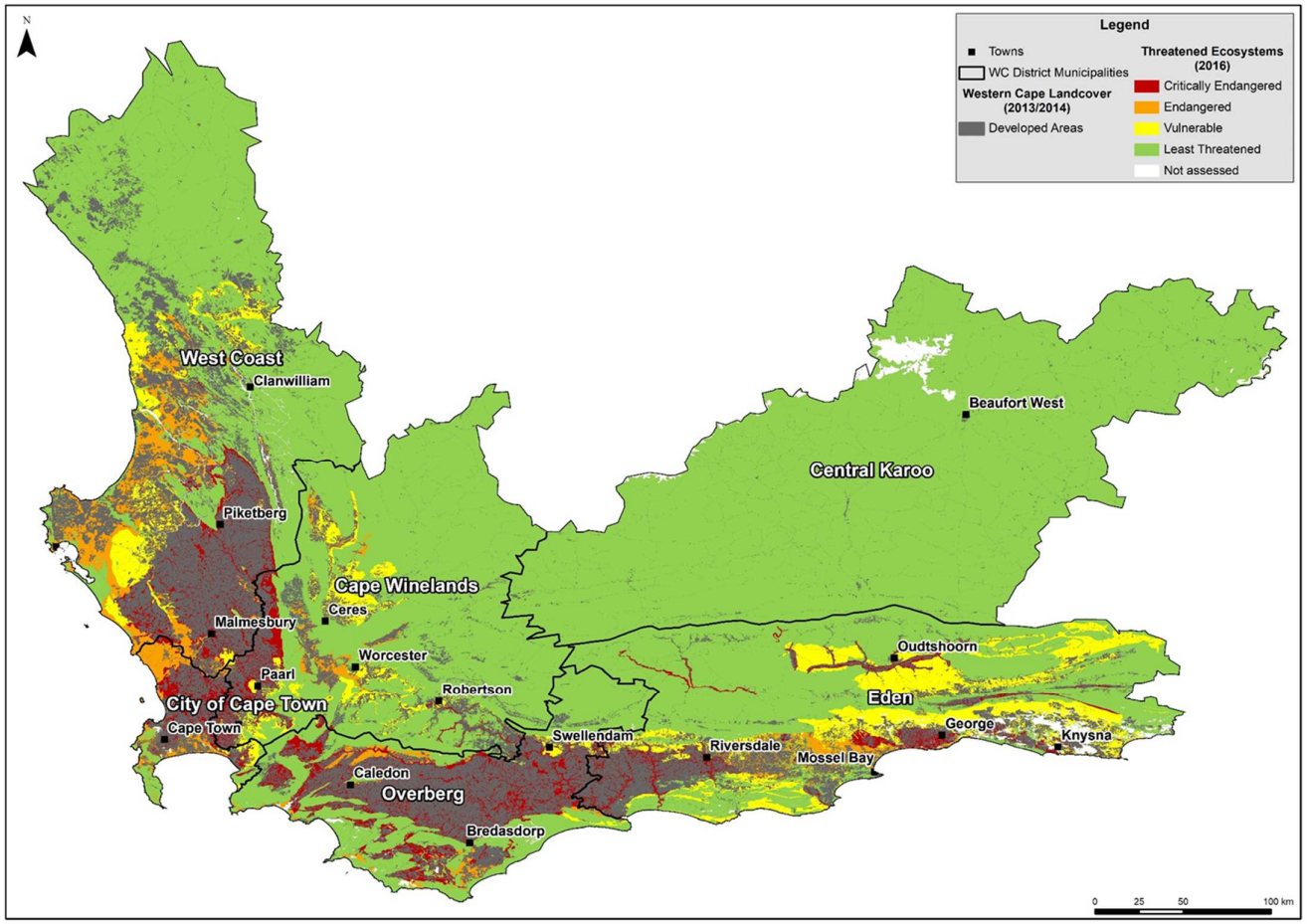

Figure 5: Ecosystem threat status in the Western Cape

Since 2011, the ecosystem threat status of eight ecosystem types in the Western Cape has increased, primarily due to habitat loss (refer to Figure 5 below)(Pence, 2017). Three additional ecosystem types have been classified as Critically Endangered, taking the total number to 24.

Ecosystem protection levels

Ecosystem protection levels are determined on the basis of the percentage of the biodiversity target for each ecosystem in Type 1 protected areas (i.e. National Parks, Provincial Nature Reserves, Local Authority Nature Reserves and DAFF Forest Nature Reserves). A total of 43 ecosystems were well protected in Type 1 protected areas in 2017, an increase of 8 from 2011; 21 ecosystems were moderately protected in 2017, an increase of 12 from 2011; 56 were poorly protected in 2017, a reduction of 20 from 2011 and 43 ecosystems were not protected at all in 2017, an increase of 15 from 2011.

Biodiversity richness affects ecosystem function. Biodiversity thus essentially sustains human well-being and socio-economic development through supporting ecosystem services such as clean water for drinking, irrigation and industrial use; fishing grounds; grazing land; pollination of crops and natural vegetation; soil formation; clean air; climate regulation; tourism opportunities; flood attenuation and disaster risk reduction (Millennium Ecosystem Assessment, 2005; Cape Nature, 2012; SANBI, 2014).

This analysis showed that the majority of ecosystems in the province were either poorly- or not- protected (99 out of 150), an worrying statistic for a province so richly endowed with biodiversity.

Biodiversity priority areas

Priority biodiversity areas in the province include terrestrial Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs) and Freshwater Ecosystem Priority Areas (FEPAs). CBAs, ESAs and FEPAs ensure that (portions) of all ecosystems in the province are conserved. In addition, the FEPA's, mostly in mountainous and high yield water areas, play a vital role in providing large amounts of excellent quality water.

The 2017 Western Cape Biodiversity Spatial Plan is the first province-wide plan to have been developed. The landcover data for the 2014 plan was derived using a different classification system. As a result, it was not possible to assess the extent of loss of Biodiversity Priority Areas between 2014 and 2017 using directly comparable datasets. However, a total of 19 270 ha of CBAs were lost between 2011 and 2014.

Habitat degradation

Habitat degradation due to both natural and human-induced erosion in the province increased by 16.2% between 2009 and 2014 (SANBI, 2009; GeoTerra, 2013/14).

Species threat status

The Red List status of species across all categories has worsened, including 50 indigenous species since 2011/12, particularly within the Critically Endangered and Endangered categories. A total of 58 species have improved conservation status since 2011/12.

The province's unique aquatic diversity is increasingly under threat, with the prime threats being invasive fish and plant species, excessive water abstraction during the dry season, pollution and damage to river banks and floodplains.

Invasive alien species

Invasive alien vegetation is thought to cover approximately 1.8 million hectares nationally, with the highest concentrations found in the south-western, southern and eastern coastal belts and the adjacent interior (Le Maitre *et al.* 2016). Invasive alien species present a number of challenges, including higher levels of surface and ground water uptake leading to reduced water availability, increased fire risk and intensity, out-competing of indigenous species resulting in natural habitat loss, and increased erosion of topsoil, amongst others. Invasive alien plants are an extensive problem in the province despite massive efforts to control them. The province also has 17 invasive fish species, of which 10 are from outside South Africa, five from outside the province and two are native to the province, but have extra-limital populations in the province.

Table 2: Biodiversity and Ecosystem Health overview

Aspect	Summary of key points
Pressures	• Urban growth • Agricultural expansion • Climate change • Invasive alien species • Over-exploitation of natural resources, including water abstraction, overgrazing and illegal harvesting of species, amongst others • Altered fire regimes • Increased pollution • Mining
Impacts	• Loss of habitats, species and ecological processes • Habitat degradation • Increased habitat fragmentation • Loss of water resources • Reduction in ecosystem services/ecological infrastructure
Challenges	• Reduction in the spatial extents of many critically endangered and endangered ecosystems • Increased number of critically endangered and endangered ecosystems types • Biodiversity management and conservation funding
Progress	• Increase in the number moderately and well protected ecosystems and expansion of protected areas • Regular updating of systematic conservation planning data and maps • Development of biodiversity planning products at a district level for incorporation into municipal Spatial Development Frameworks
Critical areas for action	• Mainstreaming of systematic biodiversity planning information into spatial planning at district and local municipal levels • Ongoing expansion of the protected area network • Management of alien vegetation • Intensified focus on retaining of the condition and extent of ecosystems, owing to their provision of goods and services. Particularly through programmes that reduce the vulnerability of the poor to the impacts of loss or degradation of ecosystems • Indicators that show when ecosystems are becoming degraded

4.3 Inland Water

OUTLOOK: DECLINING

The Western Cape is a water scarce area with a growing population that both depends and places pressure on inland water resources and ecosystems. In the face of increasing water scarcity, water resilience is recognised as a provincial priority.

Water has been identified as a Western Cape provincial risk. This is based on increased urbanisation, climate change, failing infrastructure and consumer behaviour.

The Western Cape is currently experiencing an extended drought and the province has been declared as a disaster area, while the substantial population growth in the province in recent years has placed significant additional pressure on available water resources. According to projections, climate change will increase average temperatures and possibly lower annual rainfall in the Western Cape (DEA&DP, 2014). The on-going drought makes it increasingly apparent that the Western Cape, particularly the western parts of the province, are likely to experience the projected effects of climate change, with potentially dire consequences.

The state of most inland water is poor with poor water quality in many locations, over-abstraction and extensively damaged ecosystems. While many towns currently have sufficient water to meet their needs, a number already have a water deficit. With increased demand and reduced rainfall, more towns are likely to go into deficit in the absence of adequate planning and implementation of demand management and alternative water supply projects, given present over-reliance on natural surface water resources. More than half the monitoring stations in catchments are recording "intolerable" water quality at times and invasive alien vegetation is having a substantial impact on surface and groundwater resources.

The quality of inland water resources (in terms of salinity and eutrophication) is rarely ideal and frequently intolerable in all catchments in the Western Cape, particularly the Berg River catchment. In other words, inland water is generally not fit for agricultural or industrial use and deleteriously affects aquatic ecosystems if untreated. Water for domestic purposes is treated to the required water quality standards by water service providers (typically the local authority). The majority of the population in the Western Cape is located in and around urban nodes. Urban nodes directly impact streams and other inland water ecosystems through the process of land transformation. Pressure is placed on inland water quality through contaminated stormwater, from commercial properties, and urban and semi-urban settlements.

*Tracked **indicators** of status of **Inland Water**:*

- *Water availability*
- *Fitness for use*
- *Inland water ecosystem health*

Water availability

Due to persistent drought, the Western Cape was declared a disaster area on 22 May 2017. Consequent direct and indirect economic losses are estimated to amount to billions of Rands (DEA&DP, 2016a). Crop losses, for example, have been as high as 50% to 100% in the West Coast District Municipality (DoA, 2016). The Western Cape is very dependent on surface water resources, which are vulnerable to droughts. A greater diversity of supply options, as well as decentralisation of options, might provide better resilience to drought (DEA&DP, 2017c).

Fitness for use

Fitness for use is not a simple measure of water quality because it considers both water quality and the intended water use. As mentioned above, inland water is generally not fit for agricultural or industrial use.

The prolonged drought that continues to affect the Western Cape (the province was declared a disaster area in 2017) has highlighted the severe risks to the Western Cape's water provision. Various factors, illustrated in Figure 6, have coincided to create "the perfect storm" constraining water resources (Winter, 2017).

Inland water ecosystem health

A semi-quantitative approach to assessing ecosystem health is to measure Present Ecological State (PES), based on the response of instream and riparian biota to human influences that change the integrity of habitats (for example, hydrology, geomorphology and chemical variables) (DEA&DP, 2013). The PES values show that over 20% of rivers (by length) in the Western Cape are largely or seriously modified and only 50% of rivers are natural or largely natural (category A or B).

Fortunately, only a small percentage of rivers are critically modified, mostly in the Berg River catchment.

Figure 6: "Water Resources: The Perfect Storm"

Table 3: Inland Water overview

Aspect	Summary of key points
Pressures	• Human Settlements • Agriculture and industry • Invasive alien species • Climate change (droughts and floods)
Impacts	• Loss of ecosystems and ecosystem services • Illness from contact with microbial contamination or other contaminants • Economic – increased treatment costs of poor quality water, infrastructure damage from flooding, reduced manufacturing and commercial activity, leading to job and export losses, possible loss of revenue
Challenges	• Water resource deficit • Allowance for ecological reserve • Incomplete data
Progress	• Western Cape Water Supply Scheme and town reconciliation plans that include plans to increase supply and lower demand • Working for Water, Working for Wetlands, Green Drop Programme and infrastructure grant programmes • Community, government and industry initiatives to rehabilitate rivers and wetlands • Groundwater implementation and metering • Programmes currently underway to classify water resources • Validation and verification process for abstraction and storage uses
Critical areas for action	• Continuation of demand management: minimising consumption and losses • Implementation of additional supply schemes • Poverty alleviation and formalisation of informal settlements to reduce contaminated runoff from these settlements • Minimising impacts of wastewater treatment plants on inland water

4.4 Oceans and Coasts

OUTLOOK: DECLINING

The Western Cape's 1 000 km coastline is the longest of South Africa's four coastal provinces, with roughly one third of the boundary of the Western Cape bordered by the sea (Celliers *et al*, 2010). The province is home to approximately six and a half million people, accounting for approximately 11% of South Africa's total population (StatsSA, 2017), a significant figure considering that the majority of people in the province live within 25 km of the coast (DEA&DP, 2005).

Biophysically, the coastline of the Western Cape consists of sandy beaches interspersed with occasional rocky outcrops, headlands and wave-cut platforms, with a number of important estuaries and coastal lakes (Celliers *et al*, 2010). Principal development nodes along the Western Cape coast include Cape Town, Saldanha Bay, George, Knysna, and Plettenberg Bay, while important ports are located at Cape Town, Saldanha Bay (one of only two deepwater ports in South Africa) and, to a lesser extent, Mossel Bay.

Given that coastal areas are desirable locations for settlement, industry, harvesting of natural resources as well as human recreation, pressure on these unique environments is intense. These pressures range in scale and magnitude and include global climate change, interruption of dynamic coastal processes, the introduction of alien invasive species and the effects of multiple anthropogenic discharges of waste and toxins into rivers and the ocean (Mateus & Campuzano, 2008; Pauw, 2010).

Climate variability and change is one of the biggest threats to South Africa's coastal regions. Sea level rise in combination with increasing storm frequencies and intensities, wind velocities and local conditions presents a significant threat to the coastline. Over 80% of South Africa's coast consists of sandy shores and is therefore highly susceptible to erosion (Pauw, 2010).

The state of the ocean and coastal areas *is tracked using the following key* ***indicators****:*

- *Coastal water quality (Blue Flag status)*
- *Estuary Health*
- *Number and extent of conservation and protected areas*
- *Marine ecosystem health status*
- *Extent of transformation of threatened ecosystems*
- *Number of buildings in high risk coastal areas*
- *Exploitation of fish species*

Coastal water quality

The Blue Flag programme is a voluntary international initiative aimed at standardising and promoting world-class clean, safe and attractive beach environments. A substantial increase in the number of Blue Flag beaches in the Western Cape indicates both an increased interest in monitoring coastal water quality as well as in increase in the number of beaches achieving the required water quality standards – which would be indicative on improved water quality in these areas.

Estuary health

The Western Cape's large, permanently open estuaries are (on average) in a fair state, while the temporarily open/closed estuaries vary from a good to poor condition depending on the level of pressure on them. The estuaries along the West Coast are generally in a fair to poor state due to flow reduction, pollution and - in the case of the large systems - fishing pressure. Most small temporarily open/closed estuaries around Cape Town are generally in a poor condition, while estuaries along the south and south-east coast tend to be healthier than those in the rest of the country, with the exception of those around Mossel Bay (Van Niekerk *et al*., 2017).

The full State of the Coast Outlook Report 2018 offers a detailed & more comprehensive overview of the state of the Western Cape's Coasts.

Conservation and protected areas

South Africa has 25 designated Marine Protected Areas (MPAs), of which nine are in the Western Cape Province (SANBI, 2012; DEA, 2017), in three different inshore bioregions.

At a national level the focus for the expansion of offshore MPAs has been largely supported by Operation Phakisa.

Research and planning continues and the expansion of the South African MPA network is imminent, with 18 new MPAs proposed.

Draft Notices and regulations for the expansion and rezoning of three MPAs in the Western Cape (Betty's Bay, Robberg and Goukamma MPAs) were released for public comment in July 2017.

Marine ecosystem threat status

Critically endangered habitats are distributed predominantly along the West Coast nearshore, Eden and Overberg offshore areas, as well as the continental shelf edge, owing to high levels of multiple pressures in these areas (Figure 7) (Sink *et al*., 2012). Endangered areas are concentrated between Langebaan in the northwest and Cape Agulhas in the southeast, while vulnerable coastal and benthic habitats stretch from Cape Town to the Knysna area, often for vast distances offshore.

Transformation of threatened coastal ecosystems

Within the Western Cape, approximately 12.5% of the province consisted of threatened terrestrial ecosystems in the coastal belt in 2009, of which 23.2% were categorised as critically endangered, 9.5% as endangered, and 67.2 % as vulnerable (SANBI, 2012).

Over 2 000 ha of threatened ecosystem in the coast belt (within 1 km of the shoreline) has been lost to urban development between 1990 and 2014.

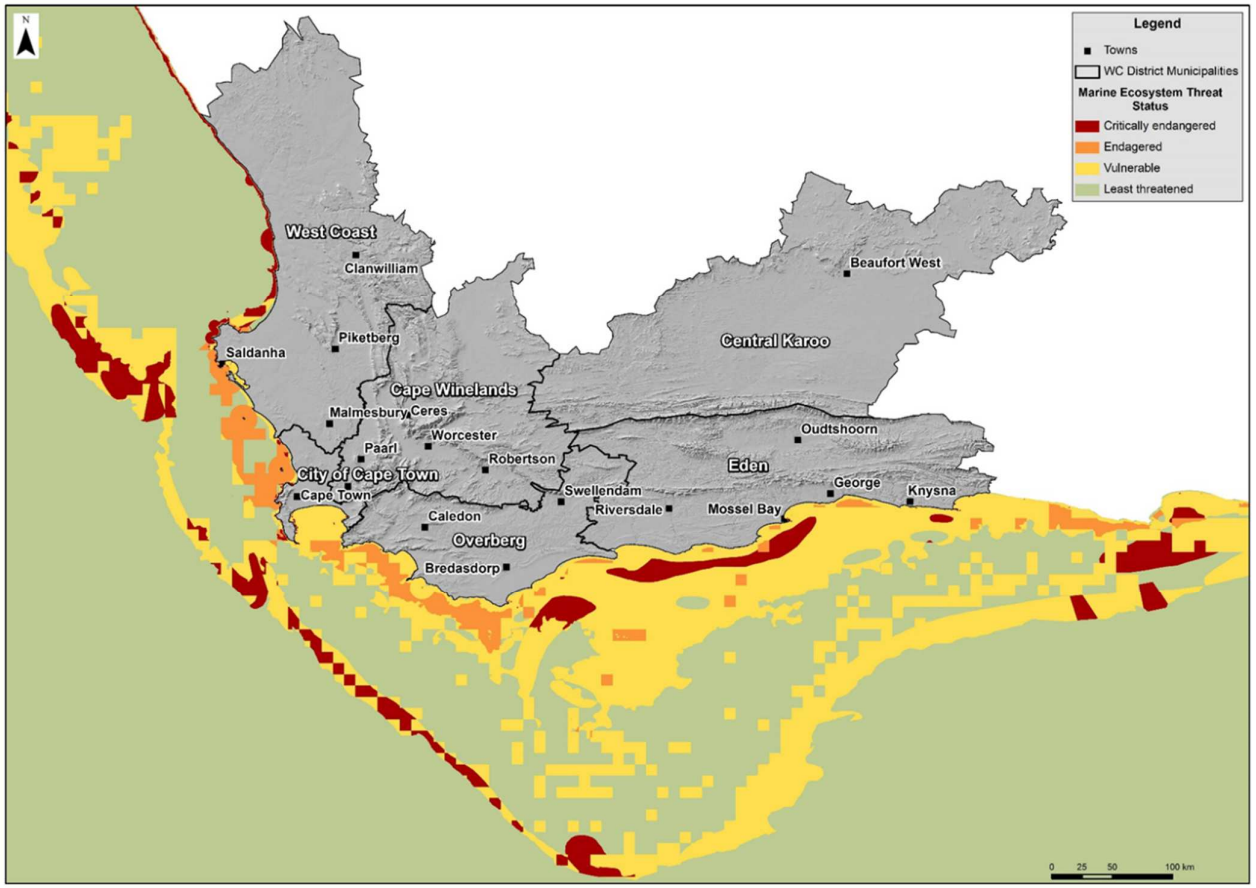

Figure 7: Marine Ecosystem Threat Status

Number of buildings in high risk coastal areas

Between 2006 and 2013, there was an approximately 40% increase in the total number of buildings in high risk coastal areas in the province with the greatest increases observed in the West Coast (46%) and Overberg (58%) districts. The Overberg District has by far the fewest buildings in the high risk coastal zone (under 3% of the buildings in the high risk zone in the Western Cape), with by far the most buildings in the high risk zone being in the West Coast District (48%). CCT and Eden District have 29% and 20% of the buildings in the high risk coastal zone respectively.

Exploitation of fish species

Populations of commercially exploited fish species are conventionally reported as being "collapsed, overexploited, optimum exploitation, under-exploited or unknown". The percentage of overexploited fish species has decreased between 2012 and 2014, indicating some recovery of selected species' stocks.

Ongoing monitoring of species' stocks remains important.
The percentage of linefish species (targeted by recreational anglers) considered collapsed" has increased between 2013 and 2016.

Table 4: Oceans and Coasts Overview

Aspect	Summary of key points
Pressures	• Human settlements and increased fresh water demand • Tourism • Resource extraction (legal and illegal) and use (living resources; off road driving; mining etc.) • Climate change
Impacts	• Compromised marine and estuarine water quality affecting ecosystem health • Risks to infrastructure in the coastal zone • Disrupted coastal dynamics and estuarine systems • Transformation of threatened ecosystems in the coastal zone • Economic value compromised • Pressure of coastal livelihoods and subsistence communities
Challenges	• Managing existing development in areas subject to coastal risk • Understanding sustainable resource extraction levels • Lack of resources and funding for stock assessments of commercial and linefish species • Climate change impacts on resource distribution and increased intensity and occurrence of severe weather events affecting high risk coastal zones • Redressing privatisation of the coastline • Compliance and enforcement constraints

Aspect	Summary of key points
Progress	• Operation Phakisa initiatives intend to stimulate and provide sustainable jobs in the Blue Economy • Small scale fishing policy is being implemented. • Coastal vulnerability assessments underway at a national level • Development of Coastal Management Lines • Coastal access strategy • Roll out of Western Cape Coastal Management Programme • Development of Estuary Management Plans • Coastal Management Plans have been adopted by National, Provincial and District Municipalities in the Province • Western Cape Coastal Access Strategy completed • Provincial Coastal Committee and Municipal Coastal Committees established and operational • State of the Coast report currently underway • Public launch site official list has been gazetted for the Province • Various NGO interventions (WESSA Blue Flag and Green Coast, WWF-SASSI)
Critical areas for action	• Implement key coastal management plans and estuary management plans • Protect sensitive marine and estuarine ecosystems • Develop of sustainable coastal livelihoods programme • Extend Blue Flag beach programme • Designate coastal access land/strips where equitable and sustainable access is required • Institutional strengthening across all spheres of government to enable effective coastal and estuary management including compliance and enforcement • Co-ordinated monitoring of estuarine and coastal environment

4.5 Human Settlements

OUTLOOK: STABLE

Some of the biggest contributors to environmental change are anthropogenic, including impacts from human settlements. The development and growth of human settlements, regardless of their size, affects the Western Cape's natural resources, increasing pressure on both renewable and non-renewable resources, including land, water, energy and minerals. In addition, expansion of human settlements risks further degradation of biodiversity and sensitive eco-systems in the Western Cape. Nevertheless, human settlements are vital and critical components of social and economic systems.

Human settlements comprise (a) physical components and infrastructure; and (b) services to which the physical elements provide support, that is to say, community services such as education, health, culture, welfare, recreation and nutrition.

Between 2011 and 2015, the Western Cape population has grown by almost half a million people, with an estimated six and a half million currently living in the province (StatsSA, 2017). Population growth is the most common driver of increased housing demand or additional housing development; however, economic status, race, age, gender and availability of employment can increase housing demand even in the absence of population growth (WCG, 2017).

The rapid population growth in the Western Cape led to growth of human settlements and rapid urbanisation, resulting in:

- A housing backlog of approximately 535 802 units, most of which are in the CCT;
- The persistence of informal dwellings, estimated at 16.6% of households;
- Inefficient urban structure, with apartheid era spatial patterns; and
- A high reliance on inadequate public transport systems, brought on by necessity rather than choice.

*Tracked **indicators** of status of **Human Settlements**:*

- *Housing demand and delivery;*
- *Access to basic services;*
- *Access to transport; and*
- *Open space provision.*

Housing demand and delivery

Availability of appropriate housing is a key issue in the Western Cape, owing to increased demand driven by population growth and in-migration. It is estimated that in 2040 the Western Cape population will reach 8.1 million, which equates to 2.6 million households; consequently the province will have to provide an additional 35 000 units per annum.

Compared to national figures, housing types in the Western Cape are marginally better, with the lowest proportion of people in informal dwellings. However, the number of households living in informal dwellings continues to increase in the CCT, primarily because population growth in CCT exceeds housing delivery rates (ACC and WC DoHS, 2017).

Access to basic services

The Western Cape continues to perform best in terms of delivery of basic services in South Africa (StatsSA CS, 2016).

The Constitution affords every citizen the right to basic water provision, and access to clean water is critical to ensure health, safety and well-being. As such, the Western Cape Government provides a quantum of free water (and electricity), especially for poor communities. Worryingly, access to potable (piped) water has decreased in the Western Cape from 99.1% in 2011 to 96.5% in 2016 (Western Cape Treasury, 2016), although the province still has the highest proportion of households with access to piped water inside dwellings.

The percentage of households with access to sanitation (flush/chemical toilets) in the Western Cape has improved from 90.5% in 2011 to 94.6% in 2016 (StatsSA CS, 2016).

Access to transport

The Western Cape has a well-established transport system and access routes compared to the rest of the country (DEA&DP, 2013).

However, impediments to providing transport and mobility include:

- High costs of public and private transport;
- Absence of public transport in low income/low density areas; and
  - Location of settlements far from economic/social centers.

In many cases commuters make use of more than one mode of transport per journey, increasing commuting costs, and highlighting the need for integration between various modes of transport in the province.

Open space provision

The Western Cape Provincial Spatial Development Framework (PSDF) indicates that there is insufficient open space in Western Cape settlements and that where open space is provided, often the design does not facilitate the intended use or spaces are underutilized because of inadequate maintenance and safety concerns.

There is very little data for open spaces (and protected and conservation areas) in the province outside of the CCT. Open space in the metropolitan area is poorly maintained and insufficient to support the expanding urban population, while in many instances, open spaces are used for other unplanned activities. Appropriately used open spaces provide employment opportunities and urban upliftment, both of which can decrease human settlements' reliance and impacts on the environment.

Table 5: Human Settlements overview

Aspect	Summary of key points
Pressures	• In-migration and urbanisation • Growing human settlements
Impacts	• Changes in human living conditions • Pollution and waste • Increased resource use and consumption • Biodiversity loss and compromised ecosystem services
Challenges	• Outdated national legislation • Integrated planning • Lagging rate of delivery
Progress	• Progress in building sustainable human settlements • Increased delivery of electricity and sanitation • Key policy responses including Living Cape: Human Settlement Framework (2017) and the Western Cape Informal Settlement Strategic Framework (2016)
Critical areas for action	• Addressing the housing backlog through innovative, sustainable solutions • Research and implementation of innovative water supply solutions for a water scarce province

4.6 Air Quality

OUTLOOK: STABLE WITH SLIGHT IMPROVEMENT

Air pollution is often only considered as an urban or industrial problem, however, it readily disperses and has the potential to affect large areas and spill over into rural districts.

Many air pollutants, such as dust and carbon dioxide can be dispersed widely away from the source, where they have various biophysical and human effects. Persistent pollutants can remain toxic in the environment for prolonged periods, continuously affecting the receiving environment and posing a threat to human health and quality of life. Hence, continued efforts to reduce air pollution and greenhouse gas (GHG) emissions are essential.

Anthropogenic activities, when combined with environmental conditions, are one of the primary drivers of deteriorating air quality. Key sectors and activities leading to air pollution include transportation, industry, residential uses and commercial activities, which generate airborne pollutants primarily through combustion processes that release gaseous emissions into the atmosphere as well as fugitive emissions from industrial processes or the built environment. Key sources of emissions in the province include:

- The **transport sector**, which is the largest consumer of energy (due to reliance on private vehicles) and the second highest contributor of GHG emissions in the province (DEA&DP, 2017b). Traffic volumes are highest within the CCT, since approximately two thirds of the province's population resides in the Greater Cape Town area. The Port of Cape Town, one of the busiest container ports in South Africa, is considered a major source of localised pollution, as are emissions from some of the 90 airports in the province.

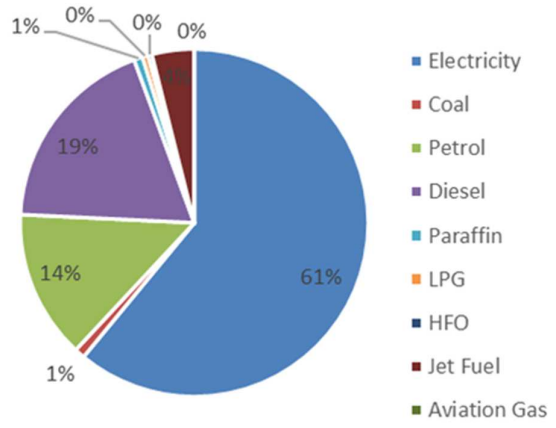

Figure 8: Sources of carbon emissions in the City of Cape Town

- **Industry** contributes to elevated gaseous and particulate matter emissions.
- Fuels combusted in the **energy** sector also emit Volatile Organic Compounds and heavy metals. Where electricity is used, emissions are in effect displaced to the location of the power plant. In the West Coast District the primary use of coal for industrial processes translates into associated releases of GHGs (DEA&DP, 2015).
- The **agricultural** sector comprises 20% of the West Coast District Municipality's economic activities, 5% in the Cape Winelands District Municipality, and 3% in the Overberg District Municipality and is a significant contributor of particulate emissions (WCG, 2016a). Emissions are seasonal, for example, high pollen counts from flowering canola or insecticides and pesticides sprayed for the duration of the growing season. Exposure to pesticides poses a threat to human health (WHO, 2008) and the environment.
- Burning of **domestic fuels** (e.g. wood, paraffin, coal, etc.) for heating and cooking remains commonplace in rural and urban settlements, giving rise to indoor air pollution.
- **Veld fires** are discrete pollution events contributing to poor air quality.

Air Quality** is tracked using the following **indicators:

- *Atmospheric Pollutants*
- *Air quality management per district*

Atmospheric pollutants

Air quality management aims to estimate human exposure to criteria pollutants to manage the impacts of deteriorating air quality. Criteria pollutants can cause harm to human health and the environment (USEPA, 2017). The DEA identified seven criteria pollutants, regulated by the South African National Ambient Air Quality Standards (NAAQS): nitrogen dioxide (NO_2); sulphur dioxide (SO_2); Ozone (O_3); particulate matter (PM_{10} and $PM_{2.5}$); benzene (C_6H_6); carbon monoxide (CO); and lead (Pb). Particulate matter, oxides of nitrogen (NO_{xes}), SO_2 and greenhouse gases are used to track air quality in the SoEOR.

- All monitoring stations in the Western Cape indicate that monitored PM_{10} concentrations are below the annual average standard (threshold) of 50 µg/m³ (in effect until 31 December 2014) and 40 µg/m³ (effective from 1 January 2015). Year-on-year decreases are evident, but longer time series data must confirm this trend.
- Annual data for NO_2 concentrations monitored at selected DEA&DP monitoring stations indicate no clear trends, although elevated levels are recorded at Khayelitsha monitoring station, likely due to vehicle emissions in this dense, urban township. Vehicular and industrial emissions are likely to be responsible for elevated NO_2 emissions in Stellenbosch and George.
- Annual average SO_2 levels between 2009 and 2015 are below the annual average limit of 50 µg/m³ at all monitoring stations. Higher SO_2 concentrations are usually attributable to emissions released by industry.

GHG is the collective term for gases in the earth's atmosphere which absorb and trap radiation within the thermal infrared range, a process also known as the Greenhouse Effect. Gases including water vapour (H2O), carbon dioxide (CO2), methane, nitrous oxide (N2O) and ozone (O3) are considered the primary GHG either due to high volumes or their effectiveness as a greenhouse gas. Anthropogenic sources such as the combustion of wood, coal, liquid fuels and natural gases are major contributors to GHG emissions. Although there has been an increase in GHG levels in the Western Cape since 2013, the per capita level of GHG emissions has remained stable.

Air quality management per district

Since 2013, there has been increased commitment to air quality related matters in the District Municipalities evident by the establishment of complaints registers, updates to Air Quality Management Plans (AQMPs), establishment of air quality bylaws and establishment of air quality forums as well as an increase in the number of monitoring stations.

The CCT, Eden District, West Coast District and Overberg District's Air Quality Management by-laws were approved and gazetted in 2010, 2012, 2013 and 2015 respectively. Due to a High Court challenge in respect of the scrap metal recovery sector, the CCT has commenced a review of its Air Quality Management by-law. The Cape Winelands and Central Karoo Districts have not yet finalised Air Quality by-laws.

Two District Municipalities (West Coast and Eden) had established Municipal Air Quality Officers/Industry Forums in 2012. These forums, which convene quarterly, are attended by industries, the Local Municipal Air Quality Officers, as well as DEA&DP Air Quality Officers, to discuss air quality matters in their respective areas.

The management of atmospheric emissions in the CCT has improved since 2013, but remains largely unchanged in the other districts.

Table 6: Air Quality overview

Aspect	Summary
Pressures	• Transportation (especially diesel) • Domestic fuel burning • Veld fires • Industrialisation
Impacts	• Brown haze • Indoor air pollution • Impacts on environment and biodiversity • Economic impacts • Health effects • Transboundary air pollution • Carbon footprint / climate change (ozone depletion)
Challenges	• Limited availability of monitoring data (spread and historical) for the province • Understanding and management of Transboundary Air Pollution • Impediments in the implementation of renewable solutions / technologies which would reduce emissions • Reduction of vehicle emissions
Progress	• Operational monitoring stations • Update of District and Provincial AQMP • Promulgation of bylaws • Implementation of licensing procedures and compliance monitoring • Authority structures and mandates / forums • Air quality compliant with the South African National Ambient Air Quality Standards • Legislation promulgated to address GHG levels
Critical areas for action	• Improve coverage of monitoring network • Improve capacity in terms of licensing and compliance monitoring • Remove impediments to innovative (green) urban development • Revolutionise transportation systems

4.7 Climate Change

OUTLOOK: DECLINING

The Intergovernmental Panel on Climate Change (IPCC, 2014) defines climate change as a change in global or regional climate patterns, due to natural variability and or as a result of human activity. The latest science confirms that this change has been accelerated through anthropogenic (human) activities, including the increased release of GHG into the atmosphere. For South Africa, under the current emissions trajectory, there is projected to be an average 1.5°C temperature increase above the 20th century average around the coast, and 3°C in the interior, by 2050, with a doubling of these figures to 3°C and 6°C by the end of the century (DEA&DP, 2016). The intention through the Paris Agreement (to which South Africa is a signatory) and SDGs is to try and limit this change to below 2°C.

The Western Cape Province has been identified as particularly vulnerable to climate change as the region is highly dependent on water storage capacity (impoundments) due to the dominant winter rainfall patterns and its coastal location (DEA&DP, 2017).

According to projections, climate change increase average temperatures and possibly lower annual rainfall in the Western Cape (refer to Table 7) (DEA&DP, 2014). Temperature projections are however more certain than rainfall projections. Climate change is clearly a significant threat to sustainable development in the Western Cape. It could undermine poverty alleviation efforts and have severe implications for food security, clean water supply, energy supply, environmental health and human settlements. Mitigating and adapting to climate change depends on systems of governance that support and enable effective societal responses (DEA&DP, 2017b).

Table 7: Recent observed trends of climate variables in the Western Cape

Climate variable	Observed trends
Temperature 	General trend of rising temperatures, including both minimum and maximum temperatures. Increasing temperatures increase evapotranspiration (which can drive a shift to droughts, and have severe impacts on agriculture). Increased temperatures and increased evapotranspiration desiccate soils and vegetation which becomes more fire-prone. On 3 March 2015, the highest temperature (42°C) in the last 100 years in Cape Town was recorded, coinciding with severe fires. On 27 October 2015, Vredendal recorded a maximum of 48.4°C, breaking the world record for a highest temperature in October.
Precipitation 	Reduction in number of rain days in autumn and summer, especially on the Southern Coast. Evidence of a trend in increasing severity/intensity of rainfall events (i.e. more rain falls in a shorter time). Winter rainfall season starting later each year. Anecdotal information of reduction of winter snow in Karoo may reduce groundwater recharge. However the current status unknown.
Wind 	Wind velocity expected to increase, with stronger South Easters. Impacts currently unknown.
Sea level rise 	Sea level has been rising at the same rate as globally. See discussion on 'sea storm surges' below.
Ocean temperature 	The Agulhas current has warmed by 1.5°C since 1980. The impact of global warming and sea-level rise has already altered the distributional range of fish and other marine species. Climate change is also responsible for shifts in the distribution of the West Coast rock lobster. However, these changes are complex and cannot necessarily all be attributed to a changing climate.
Ocean Acidification 	Ocean acidification due to rising sea temperatures would have severe impacts on most ocean life. Currently the ocean has already acidified by 0.1 pH points as a global average (this varies from region to region).

*Tracked **indicators** of **Climate Change**:*

- *Projected changes to climate variables*
- *Extreme weather events*
- *Emissions profile*

Projected changes to climate patterns

The Western Cape is perceived to be highly vulnerable to climate change, due to reliance on winter rainfall (which is likely to be affected by a changing climate). The Western Cape has experienced gradual warming of ca. 1°C over the last five decades, but changes in rainfall have been less distinct over this period. There have been numerous locally significant climate-induced disasters, but, until the current drought (2015-2017), nothing at the scale experienced by many other winter rainfall climate regions (DEA&DP, 2016).

Extreme weather events

The Western Cape is prone to the effects of climate-related hazards, which pose a significant risk to the Western Cape's economy, ecosystems and population. Between 2003 and 2008 alone, the direct costs of climate related extreme events in the Western Cape amounted to approximately R3.161 billion (Pharoah, *et al*., 2016). The 2009/10 Eden District drought damage was estimated at R300 million, the 2011 Eden District floods at R350 million and the 2012 floods at R500 million. The recent 2015/16 drought and concomitant fires, are together estimated to have cost the agriculture sector up to R4 billion in losses (DEA&DP, 2016b).

GHG emissions profile

A GHG emissions profile can be defined as a measure of the GHG emissions that are directly and indirectly caused by an activity or are accumulated over the life cycle of a product or service. The GHG emissions are typically expressed in carbon dioxide equivalents (CO_2e), which renders all GHG emission values to a common (carbon) denominator.

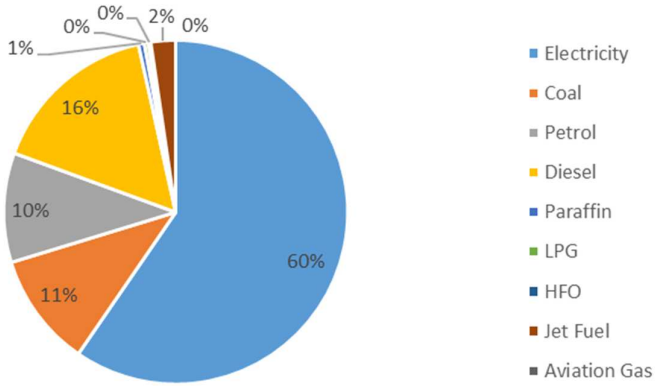

Figure 9: Western Cape Emissions by fuel source in 2016

Total energy consumption and the total energy related GHG emissions in the province have increased since 2013, while GHG emissions per capita remained the same. Electricity is the largest contributor to the province's energy emissions (refer to Figure 9).

Electricity contributes disproportionately to emissions due to the high carbon content of Eskom supplied coal-based electricity generation.

By sector, industry contributed the most to the provincial emissions profile in both 2013 and 2016 as it utilises coal-derived electricity as well as *in situ* coal and diesel. The transport and residential sectors are the next highest contributors. Emissions in the industrial, transport, commercial and residential sectors increased between 2013 and 2016, but declined in the agricultural and local government sectors. The CCT is the largest contributor of emissions at 57% with the West Coast District the second largest contributor at 19%. The Central Karoo District contributes the least (1%) to the Province's total emissions. The West Coast, Overberg and Eden Districts all increased their contribution to the Province's emissions between 2013 and 2016, whereas the CCT and the Cape Winelands District reduced their contributions (DEA&DP 2015a; 2017).

Table 8: Climate Change overview

Aspect	Summary of key points
Pressures	• Energy use • Land use change • Transportation • Industrial process and the built environment • Solid waste • Agriculture
Impacts	• More extreme weather events impacting the built environment and communities • Higher investment costs to account for climate financing and insurance • Biodiversity loss • Social structures and community infrastructure affected by extreme weather events • Infrastructure damage due to extreme weather events • Loss of agricultural land, reduced productivity and higher food prices
Challenges	• Cross sector uptake and policy mainstreaming of climate change responses • Long term, cross-sector implementation of climate change mitigation and adaptation projects, e.g. public transport, renewable energy • Integrating and aligning private sector and government climate change actions and investments • Cost of large scale adaptation measures and projects
Progress	• Western Cape Climate Change Response Strategy implementation • Western Cape Climate Change Response Strategy Biennial Monitoring and Evaluation Report • Western Cape Climate Change Mitigation Scenarios for the Energy Sector • Western Cape Energy Consumption and CO_2e Emissions Database Reporting • Status Quo Review of Climate Change and the Agriculture Sector of the Western Cape Province • Western Cape Climate Change Response Framework and Implementation Plan for the Agricultural Sector • Western Cape Green Economy Report • Climate Change Municipal Support Programme (DEA&DP)
Critical areas for action	• Improved access to funding and appropriate expenditure on mitigation and adaptation projects • Update the WCCCRS every five years to continually develop the provincial understanding of risks and vulnerabilities and with a focus on building resilience in the province • Capacity building within the WCG on climate change across sectors

4.8 Energy

OUTLOOK: STABLE

In South Africa, the energy sector is the main contributor to the country's GHG emissions, with approximately 70% of the country's electricity provided by carbon intensive coal generation (IEA, 2016). South Africa's drive to transition to a lower carbon economy, in accordance with the 2015 Paris Agreement on climate change, has led to increased public and the private sector interest and investment in renewable energy and lower carbon options such as natural gas,as well as improved energy efficiency.

The energy sector in South Africa is characterised by the duality of low production costs and high environmental impacts as a consequence of a heavy reliance on large coal reserves and other imported fossil fuels. Due to historically under-priced electricity, South Africa's economy is electricity intensive, and therefore the country contributes disproportionately to climate change (NPC, 2011). South Africa has relatively high GHG emissions whether measured per capita or by GHG intensity (emissions per unit of Gross Domestic Product per Region). This heavy reliance on coal based energy is also increasingly becoming a liability as energy prices rise to compensate for the progressive internalisation of the environmental and social costs of generating (coal based) energy.

Energy consumption in the province (excluding aviation and marine consumption) increased from 247 742 000 GigaJoule (GJ) in 2004 to 292 342 004 GJ in 2009, reduced to 276 333 250 GJ in 2013, and then increased to 299 401 470 GJ in 2016. Per capita energy consumption in the province decreased from 64 GJ in 2009 to 46 GJ in 2013, then increased slightly to 48 in 2016.

In the Western Cape, energy facilities/resources include Koeberg nuclear power station, the Open Cycle Gas Turbine peaking power stations at Gourikwa (Mossel Bay) and Ankerlig (Atlantis), numerous wind farms (e.g. Darling, Dassiesklip, Sere), the Chevron oil refinery, PetroSA and natural gas off the west and south coasts of the province. While the Western Cape Government can play an important role in facilitating energy development in the province and establishing conditions that encourage renewable energy development, uptake into the national energy mix currently remains the responsibility of national government, guided by the Integrated Energy Plan and Integrated Resource Planning policies (DEA&DP, 2013a).

***Energy** is tracked using the following key **indicators**:*

- *Energy Supply*
- *Energy Use*
- *Energy Intensity*
- *Domestic Energy Use*
- *Reliability of Energy Supply*

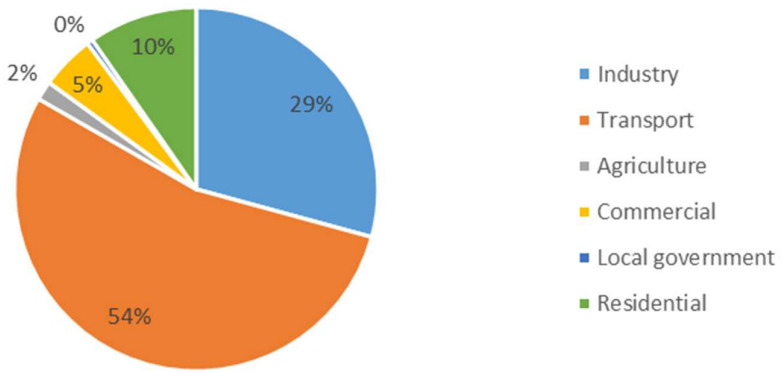

Figure 10: Western Cape energy use by sector in 2016

Energy supply

South African energy supply is dominated by coal, which powers approximately 70% of the primary energy supply. This is followed by crude oil at 13%, nuclear and gas at 3% each, and renewables at 0.3%. Residential biomass (e.g. wood burning) has been excluded from this reconciliation (~11%), which, therefore, does not add up to 100% (IEA, 2016).

The Western Cape is blessed with significant renewable energy resources, specifically in terms of wind and solar potential, and there is likely to be far more energy available in the natural environment than is required for provincial energy needs. As with the rest of the country, historic dependencies on coal-fired electricity, practical, administrative and regulatory obstacles and concerns about cost-effectiveness and a secure base load have prevented harnessing of the full potential of renewable energy. However, there is increasing momentum to make use of opportunities presented by renewable energy to supplement the national energy supply and provide stability to individual households through low cost energy generation solutions.

Energy use

Energy use in South Africa is highly dependent on fossil fuels. Fossil fuels (electricity, coal, petrol and diesel) also dominate the mix of fuel consumed in the Western Cape, in that order (WCG 2015, 2017), rendering the province vulnerable to disruptions in fairly complex supply lines. The direct use of coal (on site) by industry contributes substantially to the provincial energy profile. Between 2013 and 2016, the Western Cape's use of grid-based electricity decreased by 3%, direct use of coal increased by 5%, and the use of jet fuel remained constant at 5% of overall energy use. However, when absolute figures are considered, energy consumption has gone up across almost all fuel types (DEA&DP, 2017).

Energy intensity

The West Coast District is the most energy intensive in the province, mainly due to direct use of coal by industry. Energy intensity in the CCT is much lower, as the service sector dominates the City's economy. Although it contributes 74% to provincial GDPR, the City accounts for only 60% of the province's energy use (DEA&DP, 2017).

Domestic energy use

The 2016 Community Survey indicates that 97% of households in the Western Cape have access to electricity, the highest access level in South Africa (StatsSA CS, 2016). Access to electricity in the province has improved steadily, from 83.5% in 2005, 93.4% in 2011 to the current figure (StatsSA, 2012; DEA&DP, 2005).

The 2016 community survey reveals that approximately 2% of lighting needs, 9% of cooking needs and 14% of heating needs are powered by alternative fuel sources (StatsSA CS, 2016). Paraffin is preferred for lighting and heating, whilst gas is the preferred substitute for cooking.

Reliability of energy supply

A secure energy supply is essential for modern economies. Recurring national power shortages and rolling load shedding, as occurred in South Africa in 2014 and 2015, hinder economic growth, deter investment and impair livelihoods. At present, the outlook for energy supply security in South Africa remains uncertain (DEA&DP, 2016a), and threatens to undermine local economic development goals in the municipalities in the Western Cape. The StatsSA Community Survey in 2016 reports that 6.82% of households in the Western Cape reported an interruption to their electricity supply in the preceding three months.

Table 9: Energy overview

Aspect	Summary of key points
Pressures	• Population growth • Increase in formal housing • Growing consumerism • Economic growth (2%) • Urban growth (including transportation)
Impacts	• Carbon emissions and poor air quality • Environmental contamination and degradation • Over exploited and contaminated water resources • Loss of biodiversity • Human health risks • Visual impacts
Challenges	• Deep rooted energy dependencies, e.g. liquid fuels for transport • Supply and reliability of grid-based electricity • Role and impact of natural gas • Challenging regulatory environment • Delays in concluding agreements with Independent Power Producers (IPPs) • Enabling investment in alternative energy infrastructure
Progress	• Green economy initiatives • GreenCape greentech investment initiatives • Energy Security Game Changer • IPP facilitation/Renewable Energy Development Zones
Critical areas for action	• Drive renewable energy development • Encourage private sector and public investment in energy efficiency • Address energy intensity and dependencies • Improve understanding of natural gas potential and impact • Gather information on bird and bat mortalities from wind energy

4.9 Waste Management

OUTLOOK: CONCERN

Waste production is driven by factors such as population growth, economic development, employment levels and urban growth. As consumerism, industrialisation and urbanisation continue to increase, so too does waste generation, placing significant pressure on the ability of facilities and ecosystems to process waste.

Waste has traditionally been viewed as a by-product or end-of-use material to be disposed, an opinion which has shifted over recent years. "Waste" can play a role as a valuable resource through the reuse of waste in the manufacturing of second generation products, materials recovery and recycling industry, generation of energy, up-cycling and composting, amongst others. This shift in the approach to waste management reduces the volume of waste disposed in landfills.

The Western Cape continues to make significant strides in improving waste management and, more importantly, the integration of sustainable practices that recognise waste as a resource rather than a liability. However, there is still room for improvement.

The province's population is growing and projections indicate that population will continue to grow until at least 2040 (DEA&DP, 2017a). The regional economy, being largely service-based, differs significantly from that of the national economy, and may be less waste-intensive.

The province is urbanising rapidly, with implications for waste management, since urban populations produce double the waste of their rural counterparts (DEA&DP, 2017a). This has further implications for planning, service provision and resource consumption, key demand side pressures in the province.

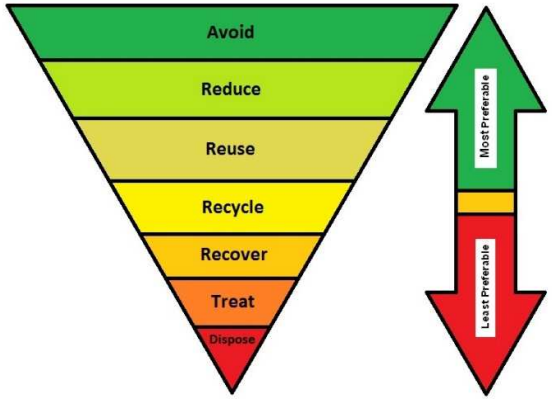

Figure 11: Waste Management Hierarchy

Waste Management** is tracked using the following **indicators:

- *Waste generation (rates and volumes)*
- *Waste characterisation (types)*
- *Waste management facilities (capacity, distribution and compliance)*
- *Waste collection services*

Waste generation

Between 2001 and 2010, the percentage increase in waste generated in the Western Cape far exceeded the rate of population and economic growth. In 2017, the CCT was expected to generate 2 447 000 tonnes of waste, followed by 269 000 tonnes in the Cape Winelands District Municipality.

Waste characterisation

Understanding waste streams is critical to successful waste management planning. In 2007, a waste characterisation study was undertaken by the DEA&DP. The study revealed that in the most of the District Municipalities, paper and cardboard were the largest category of waste available for recycling followed by organics, plastics and glass.

Waste management facilities

The number of waste management facilities (WMFs) in the Western Cape decreased between 2006 and 2017, largely due to closure of unlicensed facilities and consolidation of existing operational facilities. Rural municipalities struggle with basic waste collection and landfill management, with drop-off facilities and transfer stations becoming quite prevalent.

Waste collection services

The level of waste collection services varies across the province and, as at June 2015, most of the districts serviced between 80-100% of households. Some municipalities provide lower service levels, e.g. Hessequa and Knysna local municipalities at 62% and 73%, respectively.

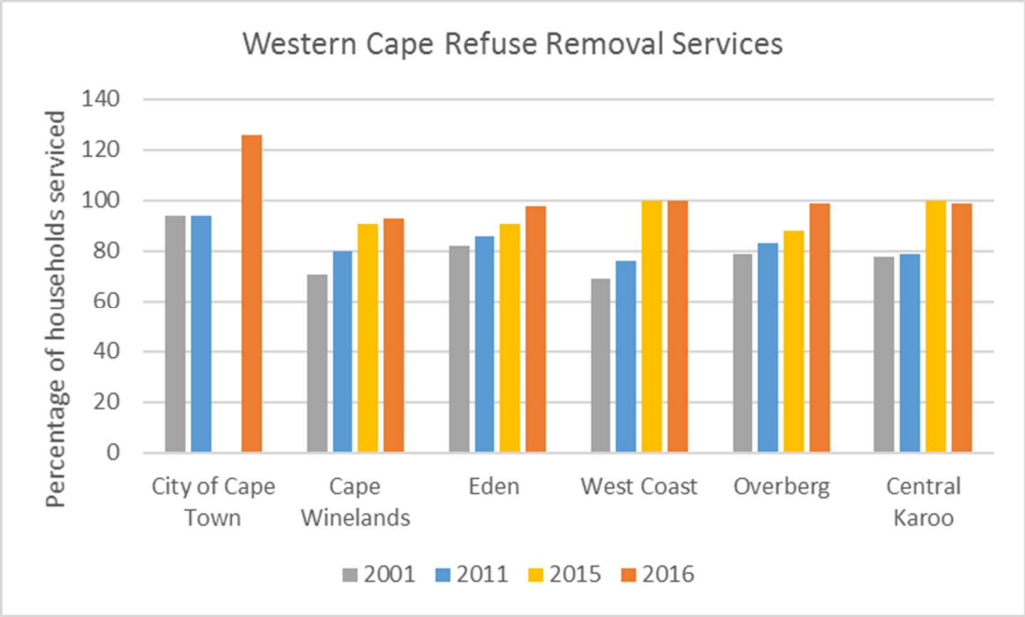

Figure 12: Refuse removal services as of August 2016

Table 10: Waste Management Overview

Aspect	Summary of key points
Pressures	• Population growth leading to increased waste generation • Employment leading to improved standard of living and greater waste production • Economic growth leading to higher standard of living • Income inequality and social well-being • Human settlements and urbanization altering lifestyles and increasing consumerism • Spatial development • Land use • Informal settlements • Housing and municipal services
Impacts	• Land use • Health effects • Contamination

Aspect	Summary of key points
Challenges	• Lack of information regarding waste characterisation (composition) and volumes which is required for planning and infrastructure interventions • Lack of reliable data from industry, businesses and households (general and hazardous waste) regarding waste avoidance, reduction and recycling • Shortage of airspace and securing available land for new WMFs • Need for additional integrated waste management infrastructure (recovery, treatment and general and hazardous WMFs) • Limited compliance with licensing conditions at WMFs and cost implications of the introduction of National Norms and Standards for Disposal of Waste to Landfill (2013) • Need for institutional strengthening, human capacity building, private sector involvement, transparent information management and improved public awareness • Inequality of waste management services, ineffective use of equipment and personnel and associated illegal dumping • Limited financial resources, ineffective cost recovery for disposal at WMFs, delays in finalising municipal budgets, theft of infrastructure, reduced operational budgets and the ineffective use of equipment and personnel (Oelofse & Godfrey 2009) • Rising costs of integrated waste management infrastructure with the need for sustainable financing
Progress	• Policy, tools and legislation • Development of regional environmental sustainability • Development of a green economy – reduction, reuse and recycling • Integrated waste management infrastructure • Regionalisation and innovation of waste services • Alternative waste treatment
Critical areas for action	• Strengthened education, capacity and advocacy towards integrated waste management • Improved integrated waste management planning and implementation for efficient waste services and infrastructure • Effective and efficient utilisation of resources • Improved compliance with environmental regulatory framework

5 SUMMARY OF ENVIRONMENTAL INDICATORS

Indicator	Key Quantifications	Target	Trend
LAND: INSUFFICIENT DATA BUT APPEARS TO BE DECLINING			
Land cover	• 65.2% natural • 33.5% transformed (16.8% degraded, 15.1% agriculture, 0.9% urban, 0.6% plantations)	• Protect natural land cover • Prevent further land transformation	**Declining**
Land capability	• No high value agricultural soils – agriculture is therefore vulnerable and require high inputs	• Sustainable agricultural practices that enhance/protect/make use of the (poor) value of existing agricultural soils	**Insufficient Historical Data**
Land transformation	• Decrease in extent of cultivation by 3.5% • 16.2% more degradation	• Prevent further degradation	**Declining**
BIODIVERSITY AND ECOSYSTEM HEALTH: DECLINING			
Ecosystem threat status	• Increase in threat status for some vegetation types due to habitat loss	• Maintain or reduce the threat status	**Declining**
Ecosystem protection level	• 43 ecosystems well protected (up by 8) • 21 moderately protected (up by 12) • 56 poorly protected (down by 20) • 43 not protected (up by 15) • Additional 24 214.5 ha protected	• Increase protection category of all ecosystems • Increase total extent of areas formally protected	**Improving**

Indicator	Key Quantifications	Target	Trend
Biodiversity priority areas	• Loss of 19 270ha of CBAs[1]	• No loss of CBAs and increase in CBAs secured in protected areas	**Declining**
Habitat degradation	• 16.2% increase in degraded land between 2009 and 2014.	• Reduce the extent of degraded land	**Declining**
Species threat status (Species)	• 50 species have higher IUCN Red List threatened status (mainly in Critically Endangered and Endangered categories) • 58 species have improved in IUCN Red List threatened status	• Reduce the Red List status of species	**Declining**
Alien invasive species	• Lack of appropriate comparable data	• Reduce density and distribution of alien invasive species	**Insufficient data**
INLAND WATER: DECLINING			
Water availability	• Western Cape declared a disaster area due to severe drought. • 12 % of towns have inadequate yield • 27% of towns exceed water supply allocation • 12% expect a deficit in 0 – 5 years • 49% expect a deficit in > 5 years • Insufficient water supply in WCWSS by 2018	• No unsustainable abstraction • Adequate water supply for all towns	**Declining**
Water quality fitness for use	• Fitness for use at river monitoring stations: o 13% ideal o 30% acceptable or tolerable o 57% intolerable o 26 stations have extremely high levels of microbial contamination	• No intolerable water quality • No stations with extremely high levels of microbial contamination	**Declining**

[1] Due to inconsistencies in data sources, this extent of loss should not be treated as absolutely accurate.

Indicator	Key Quantifications	Target	Trend
Freshwater ecosystem health	• Ecological state of rivers (PES): o 21% unmodified, natural o 28% largely natural o 17% moderately modified o 26% largely modified o 6% seriously modified o 1% critically or extremely modified	• No freshwater systems seriously or critically modified	**Declining**
OCEANS AND COASTS: DECLINING			
Coastal water quality	• Increase in Blue Flag Beaches from 18 to 31 indicative of good coastal water quality.	• Coastal water quality compliant with relevant standards	**Improving**
Estuary health	• 4% of estuarine areas in good or excellent condition • 95% of estuarine areas in fair condition • 1% of estuarine areas in poor or non-functional condition.	• No non-functional estuaries • No decline in estuary health	**High concern**
Conservation areas	• 9 MPAs • Persistent challenges • Increased recognition of management functions	• Increase in extent and good management of MPAs	**Data not comparable**
Marine area threats	• No change to critically endangered and endangered marine habitats	• No increase in threat status	**High Concern but no change**
Transformation of threatened ecosystems in coastal belt	• Loss of 2000 ha of threatened ecosystem in the coastal belt between 1990 and 2014	• No loss of threatened ecosystems in the coastal belt	**Declining**

Indicator	Key Quantifications	Target	Trend
Buildings in high risk coastal areas	• 40% increase in number of buildings in high risk coastal zone between 2006 and 2013	• No increase in number of buildings in high risk coastal zones	**Declining**
HUMAN SETTLEMENTS: STABLE			
Housing	• 16.6% of households in informal dwellings (18.2% in 2011) • Housing backlog: 529 181 (409 827 in 2011)	• Increasing % of population with access to formal housing • Shift from providing houses to providing sustainable human settlements • Shift from State as provider to State as enabler of housing provision	**Declining**
Access to basic services	• Piped water: 96.5% in 2016 (99.1% in 2011) • Electricity: 96.5% in 2016 (93.6% in 2011) • Sanitation: 94.6% in 2016 (90.5% in 2011) • Refuse removal: increased from 91.7% in 2011 – exact % not available	• Basic services to all households	**Improving**
Access to transportation	• Better transport infrastructure than much of SA • Cost constraints and dearth of bus routes persist • Some commuters still walking long distances • Poor transport service for low-income communities in rural areas	• Access to affordable public transport for all communities	**No change**
Open space provision	• Challenges to open space provision • Lack of updated data on existing open space status	• Access to open spaces for urban and rural population	**Insufficient data**

Indicator	Key Quantifications	Target	Trend
AIR QUALITY: STABLE WITH SLIGHT IMPROVEMENT			
Atmospheric pollutants	• Particulate Matter (PM_{10}) – below SA National Ambient Air Quality Standards (NAAQS) and indicates a steady decline.	• Comply with the NAAQS, with steadily declining emission rates and ambient concentrations across the province.	**Improving**
	• Nitrogen Dioxides (NO_2) – below SA NAAQS; however no visible trend • Sulphur dioxide (SO_2) – below SA NAAQS with key hotspot areas. • Greenhouse gases (GHG) – increase in levels but stable per capita.		**No change**
Air Quality Management at District Level	• Increased commitment to air quality related matters – complaints registers, Air Quality Management Plan updates, Air Quality Forums, By-Laws, Air Quality Officer appointments); and • Increased number of monitoring stations.	• Continual commitment to air quality issues in the Province	**Improving**
Key atmospheric pollutants per district	• CCT: improving • All other districts: No change		**No change**
CLIMATE CHANGE: DECLINING			
Projected changes to climate variables	• Rising (minimum and maximum) temperatures • Reduction in rain days; increasing intensity of rainfall events. Winter rainfall season starting later each year • Sea level rise aligned with global trends	• Under 2^0C increase in regional temperatures	**Declining**
Extreme weather events	• Increasingly frequent floods and droughts • Increased incidence, extent and severity of fires • More sectoral policy responses to climate change related extreme weather events	• Limit/mitigate the change in impact, frequency and intensity of extreme weather events	**Declining**
Emissions profile	• Marginal increase in absolute GHG emissions and GHG emissions per GDPR • GHG emissions per capita unchanged	• Less than 2 tonnes of CO_2-equivalent per capita by 2050	**No change**

Indicator	Key Quantifications	Target	Trend
ENERGY: IMPROVING			
Energy supply	• Increasing number and diversity of power plants. • More renewable energy • Small scale embedded generation in 15 municipalities	• Increased energy generation from renewable sources • Reduced dependence on coal	**Improving**
Energy use	• Total energy use increased by ~ 8% between 2013 and 2016 • 51% used by transport (35% in 2004 and 52% in 2009) • Mostly coal based electricity and liquid fuels • CCT consumes 54% (59% in 2013), West Coast 22% (20% in 2013))	• Decrease in coal-based energy use • Decreased reliance on coal based electricity and liquid fuels	**Improving**
Energy intensity	• 46 GJ/capita energy consumption (down from 64 GJ/capita in 2013) • 6t CO^2e/capita (down from 8t CO^2e /capita in 2013) • Decrease in intensity per unit of GDP	• Decrease in GJ/capita energy consumption • Decrease in tonnes of CO^2e /capita • Decrease in energy intensity per GDP	**Improving**
Domestic energy use	• 97.18% households electrified (up from 93.4% in 2011) • Decreasing % of households using electricity (replaced by solar PV) for heating	• 100% of households electrified • Increase in households using solar PV • Fewer households using biomass	**Improving**
Energy security	• 6.82% of households reporting interruption to electricity supply • 30% of which lasted longer than 12 hours	• Fewer power outages • Decrease in duration of interruptions • Reduced reliance on Eskom for electricity	**Insufficient historical data**
WASTE MANAGEMENT: CONCERN			
Waste generation	• % increase in waste generated far exceeded population and economic growth rate.	• Waste generation rates tracking or below population and economic growth rates.	**Declining**
	• Implementation of alternative waste management projects has improved waste diversion rates.		**Improving**

Indicator	Key Quantifications	Target	Trend
Waste characterisation	• Integrated Pollutant and Waste Information System implementation allows for improved reporting of waste generation rates. Low reporting compliance in many municipalities hinders understanding of waste streams.	• Reliable data regarding waste (general and hazardous).	**Improving**
Waste management facilities	• Fewer operational WMFs in 2017 vs 2006. • Closure of unlicensed facilities and consolidation of existing operational facilities. • All municipalities except CKDM have plans for regional facilities.	• Sufficient integrated waste management infrastructure to deal with projected waste volumes. • Increase in compliance of WMFs	**Improving**
	• Majority of the WMFs have less than 5 years of operational capacity remaining. • 11% of WMFs require small changes to operation and management • 27% of WMFs partially compliant, requiring improvements • 61% had poor compliance, requiring major improvements.		**Concern**
Waste collection services	• Increased % of households receiving weekly municipal waste removal services • Room for improvement in rural areas	• Waste collection services for all communities.	**Improving**

6 EMERGING ISSUES

A number of emerging issues/activities/ planning policies, which are likely to place additional pressure on the environment in the Western Cape, have been identified. Although not yet key drivers of environmental change, they have the potential to intensify negative effects or create adverse effects in the future. These issues should be flagged for further study and for concerted attention to preempt and manage the potential pressure on the environment, and may inform additional indicators in future SoEORs.

6.1 Ongoing effects of climate change

The persistent drought and increases in temperature and fires in the Western Cape make it increasingly apparent that the Western Cape, particularly the western sectors of the province, are exceedingly vulnerable to the effects of climate change.

Creeping drought events, wild fires and large storm events have and will continue to place pressure on and affect resources. Going forward, the province will have to ensure that natural and man-made infrastructure is resilient and prepared for climate events. This is particularly critical for the agriculture sector, food security and urban settlements (informal settlements), which are most vulnerable to climate change.

6.2 Increased renewable energy developments

Numerous plans and initiatives in the Western Cape aim to reduce reliance on the national grid, largely based on renewable alternatives. The installation of rooftop solar photovoltaic, wind farms and solar farms are likely to be the major drivers of this. In light of the move away from non-renewable energy sources, pressure will be put on those renewable energy sources available in the Western Cape, particularly solar and wind energy.

These facilities require a significant landtake and increased pressure to find suitable land while still supporting other land uses will become a growing problem in the province. This will have ramifications for sense of place and the aesthetic value of the Western Cape landscape, and place pressure on biodiversity.

The impacts of wind facilities on biodiversity in the Western Cape are not well understood; however, recent studies indicate that bat, bird and insect populations at some locations are being substantially affected by mortalities due to collisions with wind turbines.

6.3 Shale gas prospecting

Hydraulic fracturing to extract shale gas is contentious, particularly in the Western Cape, requiring further studies to frame the extent and viability of gas reserves. The viability of extracting shale gas reserves within the Karoo Basin is not yet proven, with estimates of available reserves varying widely. Shale gas exploration can contribute to addressing these knowledge gaps (DEA&DP, 2017).

6.4 Increase in sand mining

Mining in the Western Cape is insignificant compared to the rest of the country, however limestone, dolomite, sand, mineral sand, salt and diamond mining and quarrying all occur in the province. In particular, sand mines are proliferating in the West Coast and the Swartland. For example, in 2017 the Department of Mineral Resources approved controversial sand mining permits for two farms located in close proximity to local wine farms, within the Swartland District Municipality. Further sand mining could affect land use, biodiversity and the coastal environment.

6.5 Smart Growth and Transit Oriented Development

Smart Growth is an approach to development that encourages the mixed use of building types and uses, diverse housing and transportation options and development within existing human settlements, supported by community engagement. In the Western Cape, Smart Growth is expedited through the efficient use of land and infrastructure to contain urban sprawl and prioritise infill, densification and redevelopment within the city (WCG, 2014).

Transit Oriented Development (TOD) accommodates a mixture of housing, office, retail and/or other amenities integrated into a walkable neighbourhood located reasonably close to public transport systems.

6.6 Need to preserve sense of place

The Western Cape is famed for scenic landscapes, historic settlements and the sense of place associated with them. These are increasingly threatened by inappropriate and poorly conceived developments that diminish the unique identity and experience of vistas, spaces and towns. This can be addressed by assigning value to scenic routes and cultural landscapes and by improving human settlements management systems and ensuring that the appropriate sustainable development considerations are prioritised (WCG, 2014).

6.7 Shortage of landfill airspace

With increasing population, economic growth and relative prosperity in the province comes increased production and consumption, and concomitant waste generation. There is an imminent shortage of landfill airspace, and securing land for new WMFs is proving difficult. Only nine WMFs in the province have 10 or more years' airspace remaining, and new WMFs will need to be constructed. Alternatively, more waste must be diverted from WMFs for reuse, composting or recycling, or reduced at source.

6.8 Declining pollinator populations

A growing body of literature points to a global decline in populations of pollinator species such as bees, bumblebees, moths, flies, wasps, beetles, birds and bats. The decline has been attributed to various factors including exposure to pathogens, parasites, and pesticides; habitat fragmentation, degradation and loss; climate change; market forces; intra- and inter-specific competition with native and invasive species; invasive plant species; bee genetics; and transgenic crops, amongst others (NRCNA, 2007).

Declining pollinator populations pose a serious and far-reaching challenge which needs to be addressed to ensure the sustainability of food production systems, avoid additional economic impacts on the agricultural sector, and protect the health of the environment (United States Government, 2014).

7 KEY ACTIONS AND STRATEGIC PRIORITIES

The key areas of action and strategic priorities that need to be responded to in order to address the declining trend of the state of our natural resources and to enhance the gains made in the socio- economic conditions within the Western Cape are as follows:

Sustainable built environment and infrastructure

- Address impediments to innovative green urban development and off- grid infrastructure;
- Stimulate large-scale changes to energy and transport systems (support renewable energy development, waste-to-energy initiatives);
- Identify new funding mechanisms; and
- Adopt integrated planning approaches that align development actions.

Actively strengthen ecosystem services

- Protect natural resources that provide ecological goods and services;
- Protect CBAs and adopt biodiversity planning in local Spatial Development Frameworks;
- Restore degraded riverine habitat and corridors;
- Develop green infrastructure; and
- Implement coastal management plans to protect marine ecosystems.

Curb wastage of resources

- Increase options for water reuse and curb water reticulation losses;
- Support conservation agriculture where it relates to water use;
- Remove regulatory constraints that inhibit reuse of water and industrial symbiosis;
- Transform traditional perceptions of waste so that waste is viewed as a resource and not a liability; and
- Introduce incentives to reduce waste.

Good Governance

- Properly license WMFs and report on volumes and types of waste;
- Improve the extent and coordination of air quality monitoring;
- Update information on land cover;
- Gather information on private sector initiatives in the waste, air quality, energy and climate change fields;
- Enhance systems for integrated planning and implementation; and
- Ensure environmental sector plans are up to date and included in planning documents.

Build resilient communities which can earn a living

- Adopt and support large scale conservation agriculture;
- Implement sustainable coastal livelihoods programmes;
- Support Green Economy development; and
- Develop and implement local climate change adaptation plans.

8 CONCLUSION

The Western Cape is custodian of a rich, varied and treasured natural environment, which sustains the livelihoods of everyone in the province, whether through the provision of foodstuffs or as building blocks for the diverse economy. The SoEOR shows that the pressures on natural systems are unsustainable: more needs to be done to protect critically sensitive or important environmental features, without which the ability of the region to adapt to impacts from increasing population and climate change is uncertain.

Worryingly, declining trends are a feature across most biophysical themes. The state of land, biodiversity and ecosystem health, inland water, climate change, oceans and coasts, and waste management are declining or of concern, with a stable outlook for human settlements, energy and air quality.

Declining trends reported in the SoEOR clearly align with two of the World Economic Forum's Global Risks for 2017 under the environmental category: extreme weather events and water crises. Not responding timeously and effectively to declining trends in environmental health can lead to other key risks: failing to meet sustainability and resilience goals.

An accelerated shift in the *modus operandi* is required throughout the province to respond to these findings. If the approach to environmental resource management as well as service provision and economic activity does not change, the costs of doing business will increase. This will be due to rising disaster management expenditure, failure of vulnerable economies (e.g. fisheries, small-scale agriculture) and ecosystem services having to be replaced by man-made interventions. Moving forward, service delivery and economic growth must be resource efficient low carbon, and enhance societal resilience to find a more balanced approach to using limited resources.

The vision reflected in National and Provincial strategic documents should be implemented. The key objectives and actions of the National Development Plan, the New Growth Plan and the National Strategy for Sustainable Development highlight the need to achieve a sustainable future for all South Africans. This vision of a sustainable future is reiterated in the high level Western Cape Government planning processes namely the OneCape 2040 Vision and the Provincial Strategic Objectives, as well as in initiatives such as the Green Economy Framework and Skills Programme.

State of Environment reporting is a useful reporting tool for tracking resource utilisation trends. However, large scale conservation or environmental management interventions will not on their own shift consumption patterns in the province. It is our actions, our services and our consumption patterns which influence trends. Routine private, business and government decisions and activities will cumulatively change how we use or abuse our environment.

So let us start making a change today while we still can. **Better Together.**

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Department of Environmental Affairs and Development Planning
Chief Directorate: Sustainability
Leeusig Building, 3rd Floor, 1 Dorp Street, Cape Town,
8001 Private Bag X9086, Cape Town, 8000s
tel: +27 21 483 4091 **fax:** +27 21 483 3016
Email: enquiries.eadp@westerncape.gov.za
www.westerncape.gov.za

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