

To: Dept Environment Affairs
Pretoria

Comments on Final Environmental Impact Assessment Report for the Eskom Nuclear Power Station and Associated Infrastructure (Nuclear-1)

Report compiled on behalf of the Thyspunt Alliance and Friends of the St Francis Nature Areas (FOSTER) by

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Preamble

The content of this report is, with one exception, identical to the report submitted as comment on the Draft EIA Version 2. This is because the responses made by the EAP² to the criticisms listed in our report (as part of the submission made by Cullinan and Associates) were unsatisfactory and resulted in no substantive amendments, as reflected in the Final EIA report. Therefore, the comments listed below apply equally to the Draft and Final reports.

The exception relates to the Dune Geomorphology report where I stated in our comments on the Draft EIA: “A thorough peer-review would have identified these shortcomings, **but no peer-review report for this chapter is provided in the EIA Report.**” I reiterate that there was no peer-review report in the Draft EIA Version 2. The review was, however, included in the Final EIA Report. The reviewer, who happened to be the consultant’s PhD supervisor and is thus not entirely independent, was generally supportive of the report’s contents. However, it is worth quoting several extracts from this peer-review report:

“Of the three sites under consideration...the Thyspunt site is by far the most sensitive, by far the most complex, and by far the most problematic.” (p. 3).

“It needs to be stressed, nevertheless, that ill considered disturbance of any dunefield (whether mobile or fixed, small or large) has the potential to activate unwanted deflation and deposition that can cause long-term maintenance problems. With respect to the Thyspunt site report (1) evaluates and rates seven issues as “*high significance*”, and a further three as “*medium to high significance*” (see Table 6.3 in report (1)). An additional evaluation of the Thyspunt site appears in Table 5.1 in report (2). There are clear indications of the general level of environmental sensitivity and complexity of the Thyspunt site.” (pp. 3-4).

“Frankly, dune systems are not attractive construction sites, and offer little luxury of alternative viewpoints. In fact, coastal dunefields are notoriously dynamic. In addition, the St Francis headland dunefield is a wet dunefield susceptible (sic) to severe flash-flood events...”³ (p. 4).

“However, the problematic complexity and environmental sensitivity at the Thyspunt site puts it in a different class entirely. Here it is not so much a matter of an alternative viewpoints (sic) insofar as the environmental setting goes, but a question of how to successfully deal with the dunefield environment during the various phases of constructing and operating a nuclear power station. Mundane but essential land based operations such as road construction, foundation excavation, spoil disposal, contractors’ yards, erection of transmission lines, stormwater drainage, topsoil disturbance, revegetation, etc, etc, all take on a different meaning in a dunefield environment.” (p. 4).

It is absolutely clear from these comments that impacts and risks associated with building a nuclear facility at Thyspunt are far greater than at Duynefontein.

² Arcus Gibb Ref: J31314

³ Prof Ellery’s comments on the Draft EIA Version 2 provide new data and insights on this phenomenon.

As indicated below, our report identifies three fatal flaws in the EIA, according to our conception of what constitutes a fatal flaw. The DEA conception is as follows: “Any problem, issue or conflict (real or perceived) that could result in proposals being rejected or stopped”⁴. This definition is much too vague to have any operational use. The EIA also fails to provide a meaningful definition of a fatal flaw. On the other hand, our characterization of fatal flaws in the three contexts identified below, are clear and unambiguous.

Introduction

The Executive Summary and Impact Assessment chapters in this EIA Report are a disgrace. They are full of contradictions, obfuscations and manipulations of evidence and data in order to favour the development. In other words they show bias. Intriguingly, they fail to make the point upfront that the development of a nuclear power station (NPS) at Thyspunt will constitute a massive, if not unprecedented (in a national context) infrastructure programme that will have a permanent and enormous negative impact on irreplaceable natural features of global significance.

The Impact Assessment (Ch. 10) concludes that “...both sites are environmentally acceptable for a nuclear power station”. It also states with regard to Thyspunt that “The proposed NPS could accordingly be developed without a material reduction in the ecological value”. The arrival at such a conclusion is a function of – as we shall show below – a cynical manipulation of the scoring system used in the EIA. The real picture that emerges from the specialist reports studied here (Dune geomorphology, wetlands and heritage) is that the consequences and likelihood of substantive impacts are much higher overall at Thyspunt than Duynefontein (this argument is fleshed out in the main body of this report).

This glaring mismatch between what the consultants conclude about negative impacts in some of the specialist reports, and the outcomes of the impact assessment, has enabled the EIA consultant to avoid assigning a fatal flaw (“The project cannot be authorized”) for any impact of significance at Thyspunt. We argue below that there are **three fatal flaws** associated with the NPS, namely impacts on the bypass dune system, the wetlands and the heritage resources. We detail our arguments below. Next we challenge the report’s untested assumption that the no go alternative will inevitably result in coastal resort development of the site and, consequently, a greater impact than a NPS and its associated infrastructure. We then compare the impacts of the proposed development at Duynefontein and Thyspunt. Finally, we make recommendation for an alternative no go scenario that is consistent with the conservation of Thyspunt’s irreplaceable natural and heritage features.

⁴ DEAT (2002) Impact Significance. Integrated Environmental Management. Information Series 5, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

Dune geomorphology⁵

This is a poor assessment, deficient in data, underpinned by an outdated literature and replete with blatant contradictions. In our opinion, the report should be rejected on scientific grounds. We justify why below.

The assessment states that “The geomorphologic conservation value of the headland-bypass dunefields at Thyspunt is high, as they are the only remaining large dunefields of this type that are still active in South Africa. The headland-bypass dunefields at Cape St. Francis are unique on a local, regional and probably global scale. The vegetated dunefield is a classic, almost pristine example of a suite of Holocene and Pleistocene dune ridges with a variety of origins: parabolic dunes, hairpin parabolic dunes, and sidewalls of previously mobile headland-bypass dunefields, including fairly unique examples of such sidewalls. Overall, the dunefields at Thyspunt has high interpretive value for elucidating coastal dune dynamics”. Yet this same assessment recommends that the establishment of massive infrastructure in this conservation-worthy and highly dynamic landscape is feasible and acceptable in its impacts. This is a profound contradiction.

The assessment is based on an outdated literature. There has been a huge increase in the primary scientific literature since the 2000s on Cenozoic sediments. In particular, there is a substantial literature challenging the notion that dune mobility is driven by either aridity or wind; it has been known for more than 10 years that dunes are much more complex systems than previously thought and that fluvial processes play an important role in preserving their mobility in certain contexts. Failing to consider the relevant, contemporary literature is reason enough to reject this report.

The assessment rejects in an entirely subjective manner, a scientifically rigorous, alternative hypothesis posited by Prof Ellery on the role of fluvial processes in driving dune dynamics in the eastern sector of the Oyster Bay dunefield⁶. Prof Ellery, who is internationally recognized for his contribution to the literature on fluvial processes (amongst others), has been conducting research on the Oyster Bay dunefields for the past six years. He and his team collected valuable data after the 2011 floods, which were reported in the response to the first draft of the EIA Report. Yet the consultant has rejected Ellery’s findings, which – unlike his own – are underpinned by data⁷. This gross transgression of the scientific method should disqualify this assessment from any further consideration.

The assessment relies only on photographs to support its rejection of Ellery’s hypothesis. We would expect, as a bare minimum for assessing the significance of aeolian versus fluvial processes in driving

⁵ Comments refer to the Oct 2010 assessment as well as addendum assessments produced in Sep 2010 and Jun 2013.

⁶ See Elkington L. 2012. An investigation of the relationship between morphology, patterns and processes in a headland bypass dunefield in the Eastern Cape, South Africa. MSc thesis (unpublished), Rhodes University, Grahamstown. 161 pp and Appendices A and B. Note that Elkington’s thesis was subject to peer-review by two expert scientists and awarded a distinction.

⁷ Prof Ellery has provided a response to the assessment in the second (Oct 2015) draft of the EIA Report (included with the submissions made by the Thyspunt Alliance) which provided even more data on the dynamics of the Oyster Bay dunefield.

dune dynamics, data on: grain size in the eastern and western sectors of the dunefield; evidence of water transport in thin sections of aeolianite (dune rock); and evidence of debris flows at the base of dunes. The absence of any data since the Burkinshaw PhD (1998) is a serious flaw in this assessment.

While rejecting Ellery's fluvial hypothesis, the assessment emphasizes the importance of fluvial processes in modifying the dunes in the eastern sector of the Oyster Bay dunefield. Thus, it states on p 17 "The eastern third quarter of the dunefield is drained by the Sand River, which flows episodically during periods of high rainfall; floods transport appreciable volumes of sand to the Kromme estuary". This totally contradicts the assessment's assertion that the dynamics of the entire dunefield are wind generated.

The assessment states that the "November 2007 flood that damaged the R330 is estimated to be a 1:200 year event". However, just four years later, commenting on the 2011/12 floods which destroyed infrastructure on the R330, the assessment states the following: "Flash-floods are caused by moving dunes that block the Sand River channel within the dunefield during dry periods. When the river flows again, water would pond against the dunes until the interdune ponds overflow and breach, causing a catastrophic flash-flood. Large amounts of sediment and plants may be transported by the high energy peak water flow". We believe that by invoking the 1: 200 year risk scenario, the assessment is downplaying the risk of damage by flooding to transport infrastructure required for the development. The major prediction associated with global change dynamics is an increase in synoptic events that will produce unusual weather conditions, especially floods. The fact that three major flooding events in the dunefield have occurred in the past eight years should be sufficient to justify a more precautionary approach.

The impact assessment (pp 66-68) for the Thyspunt site states that the following impacts have, without mitigation, combinations of high consequence and high probability⁸:

- Haul road across mobile dunes: Impact on dune groundwater-wetland dynamics
- Transmission lines across mobile dunes and wetlands: construction infrastructure and access roads
- Transmission lines across vegetated dunes: construction infrastructure and access roads.

The mitigation measures proposed for all of these impacts are of dubious effectiveness. It is important to bear in mind that the consultant is not an engineer with experience in designing structures to mitigate the impacts of hard infrastructure on dynamic and soft surfaces, nor has he provided references from the scientific literature that assess the feasibility of such structures. As a bare minimum, it is essential that we have access to the peer-review report on this assessment (which is not included in the report). According to Table 4 in Ch 10, high consequence – high probability (= high likelihood) impacts have residual risk rating that indicates a ***fatal flaw***. This implies that the three impacts identified above actually constitute fatal flaws. This issue is ignored in Ch 10. No reason is given for this crucial omission Why?

⁸ Chapter 10 states: "Although the principle is one of probability, the term 'likelihood' is used to give expression to a qualitative rather than quantitative assessment, because the term 'probability' tends to denote a mathematical/empirical expression". Strictly speaking, this is not true. However, the important point is that the EIA report conflates probability and likelihood.

Freshwater ecology and wetland monitoring⁹

This freshwater ecology assessment makes it clear that the wetlands at Thyspunt are of outstanding conservation value and should not be subject to disturbance that would impair their persistence. Thus, the report states: “The site includes portions of wetlands of extremely high conservation status, which are considered part of a one-of-a-kind system. Any impacts that threaten the interconnected functions or present ecological state of the duneslack wetlands, the permanently vegetated hillslope seeps that include the Langefonteinvelei, the parallel valley bottom wetlands or the coastal seep systems is (sic) considered of high negative significance”. It also states that “the wetlands are considered unique systems that are unlikely to be represented in their present form and complexity elsewhere in the world”. However, the report strives to evade the implications of this statement by the spurious argument that a “no-development” alternative would result in unregulated resort creep that would damage the area more than a NPS, assuming that ESKOM invests heavily in further property acquisition and environmental management. In other words, better the devil you know than the one you don’t. We return to this issue when we discuss the no go alternative in more detail.

There are some profound problems with the impact assessments in both the Day report on wetlands and in Ch. 10. Thus, the assessment rating allocates a low probability to the loss of the Langefontein wetlands both with and without mitigation. However, the Wetland Monitoring Report states: “In the event that drawdown did result in loss of flows from the eastern and northern portions of the wetland such that wetland hydrology was affected, the impacts could be of high significance, depending on their duration and extent. While it is likely that the thick organic layer that underlies the entire wetland would provide a measure of short-term buffering against loss of water to drawdown, such organic layers are sensitive to desiccation and, once drying commences, it is often irreversible, resulting in changes to the hydric properties of the organic sediments. If such changes took place in the Langefonteinvelei, drawdown impacts would result in an irreversible loss of the *Cladium mariscus* wetland habitat, and moreover, be associated with a high potential for long-term subsurface fires in dessicated organic sediments. Such impacts could also give rise to head-cut erosion of the wetland, by trickle flows of groundwater across the wetland surface”. One can only conclude that there is considerable uncertainty regarding impacts of the NPS infrastructure, including the eastern access route, on what is, in the consultant’s words, a “one-of-kind system”. This is made more serious by the peer-review report of the geohydrological model (Appendix E27) used to predict impacts. This report states: “GCS (the consultant) is not convinced that the numerical models presented can simulate the cut-off wall options for mitigation of dewatering. The vertical and horizontal discretization of the grids are not adequate for this. So the jury is still out if it should be considered”. Why were these uncertainties not considered in the likelihood analysis? Where expert opinion expresses such a level of uncertainty the precautionary principle should apply.

The second impact scored in the assessment as having high consequence and high probability without mitigation, is the loss or degradation of coastal seep wetlands. However, the mitigation measures are

⁹ Comments refer to Liz day and SRK reports.

subject to the same caveats regarding the model that underpins them. So reducing the impacts after considering mitigation is not justified; the mitigation measures are untested in this context.

Bizarrely, Ch. 10 concludes that the residual risk for wetland impacts is low. How can this be, based on the reports in possession of the EIA team? And why did this report not categorise these impacts, instead referring the reader to the specialist assessment (this was not done for any of the other impacts). Our assessments suggest that the impacts of the NPS on wetlands represent a ***fatal flaw***. In the words of the consultant: “ The above impacts are likely to result in significant degradation of a system that presently exists as a relatively unimpacted mosaic of terrestrial and wetland habitats, with high levels of interconnectivity and high overall biodiversity value, to which the wetland systems make a significant contribution. The cumulative impacts of the proposed development of a single NPS at the Thyspunt site without implementation of mitigation measures have been assessed as of high negative significance”. As we can see from the peer-review report, these mitigation methods are underpinned by an unreliable model.

Heritage

The specialist report found that the Thyspunt site is regarded as a “Cultural Landscape” as defined by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage Convention. It also states that “the wilderness qualities of this portion of the coast in contiguity with the archaeological heritage are exceptional and make a substantial contribution to the character of the region. Given the mass and bulk of the proposed activity, un-mitigatable cultural landscape impacts are expected”. - Of deep concern, there is in the assessment no impact assessment using the impact criteria and tabular layout provided by the EIA team. This appears in Ch. 10 where unmitigated impacts on cultural landscape are allocated a “high” category for both Thyspunt and Duynfontein. This is totally unacceptable, given the statements made in the report. Thus, for Thyspunt, the assessment has this to say: “The cultural landscape significance of the place relates mainly to its superb natural heritage, pre-colonial heritage, setting and contribution to the wilderness qualities of the region. In terms of the UNESCO definition of a “cultural landscape” – a distinct area containing the combined works of nature and people - Thyspunt and environs is a uniquely intact pre-colonial cultural landscape that contains the intact evidence of how pre-colonial people used the landscape – a complete settlement pattern”. Regarding Duynfontein, the assessment states: “Of the three sites, this is marginally the least contentious. In cultural landscape terms the nuclear industrial presence is already established and accepted as a landmark by most Capetonians. Any additions to this will be additions to an already established identity”. In other words, Duynfontein, located within a large metropolitan area, has limited cultural landscape qualities. And yet the residual risk of the impact analysis in Ch 10 is allocated as “moderate” for both sites. How was this spurious decision arrived at? Given the above comments from the assessment , one can only conclude a dereliction of duty on behalf of the EIA team. It is clear from the assessment that the establishment of a NPS would impact the Thyspunt cultural landscape with definite likelihood and high consequence. Accordingly this impact represents a ***fatal flaw***. Building a “visitors centre...for the storage and display of heritage artefacts that are affected by construction activities” (Ch. 10) is by no means going to mitigate for this loss.

No-go alternative

The Executive Summary has this to say on the no-go alternative: “This EIR does not suggest that the current (No-Go) situation is without negative impacts of its own. Indeed, the majority of the biophysical specialists have indicated that there are significant current sources of environmental degradation around the sites that would be likely to continue. Thyspunt is a case in point, where recent development (in terms of urban development and golf estate development) have resulted in significant degradation and destruction of heritage sites, wetlands and portions of sensitive mobile dune systems. Analysis of these development trends, according to the specialists, shows (sic) no indication that the no-go alternative would result in these impacts slowing down or ceasing”. It also reports that “should Eskom not utilise the sites for nuclear development, it is likely to sell the properties, pending a decision by the Eskom Board. The sale of the properties will be to a willing buyer at the market-related price, which would probably result in an alternative form of land use that may have environmental impacts of its own”.

Based on this scenario, several of the specialist reports make the point that the no-go alternative is less desirable in terms of impacts on biophysical resources at Thyspunt than a NPS. They envision that unmanaged and rampant coastal resort development will destroy and fragment natural and heritage resources in a more severe manner than a NPS. This is an assumption. There are no data in the EIA Report confirming (that) “development trends, according to the specialists, shows (sic) no indication that the no-go alternative would result in these impacts slowing down or ceasing”.

The following points challenge the spurious and misleading future development scenario advanced in the EIA report:

- Existing developments in the Thyspunt area were approved decades ago (starting in the 1940s and accelerating in the 1980s-late 1990s) when environmental regulation was less stringent than now.
- The rate of expansion of the footprints for Cape St Francis and St Francis Bay have slowed dramatically since the 1990s.
- The cost of building infrastructure to access the Thyspunt area from the west, east or north is likely to be prohibitive for any resort development.
- Achieving a favourable record of decision for a development is highly unlikely, given the uniqueness and hydrological complexity of the site.
- A vigorous and well-informed civil society would oppose future resort development in the area with as much energy and dedication as they have opposed this NPS.
- According to the Garden Route Biodiversity Sector Plan¹⁰ the entire NPS footprint on Pleistocene-Holocene dunes at Thyspunt is classified as Critical Biodiversity Area or Ecological

¹⁰ Vromans, D.C., Maree, K.S., Holness, S. and Job, N. and Brown, A.E. 2010. The Garden Route Biodiversity Sector Plan for the Kouga and Koukamma Municipalities. Supporting land-use planning and decision-making in Critical Biodiversity Areas and Ecological Support Areas for sustainable development. Garden Route Initiative. South African National Parks. Knysna.

Support Areas¹¹. In terms of planning guidelines, these are no-go areas (see Appendix 1). While not legally binding, they are highly influential. Thus, “The BSP (Biodiversity Sector Plan) is intended to support land-use planning and decision-making for sustainable development. It will help inform the planning and management tools that municipalities are required to develop, such as Integrated Development Plans (IDPs) and Spatial Development Frameworks (SDFs), including Environmental Management Frameworks (EMFs), environmental assessments and land-use decisions⁶”. For example, a development proposed to transform a CBA on the fringes of Jeffreys Bay was recently rejected by DEDEAT. Similarly, a development immediately west of Cape St Francis was abandoned owing to potential impacts on heritage resources and terrestrial biodiversity.

- The Eastern Cape Parks and Tourism agency has identified in its draft protected area expansion strategy that the coastal dunefields west of Cape St Francis (which encompass the Thyspunt NPS footprint) are a priority. This will further restrict development of resorts in the area.

Several specialist assessments maintain that the ESKOM presence would ensure better environmental management than at present, and if wasn’t for this ESKOM presence dating back to the 1980s, the site would have become more degraded than it is presently. It is our experience that ESKOM had a very poor record of environmental stewardship at the Thyspunt site. The eradication of alien vegetation, the biggest threat currently experienced by the site, has only recently been initiated, with the appointment of an on-site environmental officer in the last few years. This, despite recommendations for an alien clearing programme made in a report commissioned by ESKOM in 1997¹². In contrast, other landowners to the west of the Thyspunt footprint have cleared many hundreds of hectares of alien vegetation over the past 20 years. Our view is that the environmental quality of the site has deteriorated under ESKOM’s ownership.

¹¹ The Botany and Dune Ecology assessment failed to consider in its revised (Feb 2012) report, the fine-scale and comprehensive conservation plan produced by the Garden Route Initiative. This would have provided a more informed means of assessing the conservation value of Thyspunt’s vegetation types than that provided by the crude-scale of the Rutherford and Mucina scheme (note that this scheme incorrectly mapped the mobile dunefields as South Coast Fynbos). This omission to consider finer-scale biodiversity plans was picked up in the Peer Review report prepared by Scientific Aquatic Services, which “recommended that a review of the desktop databases such as those available on the SANBI BGIS webpage is undertaken to determine whether any additional regional or local desktop data is available and the necessary amendments to the reports made (*such as the Garden Route Initiative data, made available in 2008 and published in 2010 – our italics*). A comprehensive summary of national and regional legislation pertaining to the study is provided in the report. However, several new amendments and laws, such as the National Environmental Management: Biodiversity Act (Act 10 of 2004): Alien and Invasive Species Regulations, GN R598 of 2014, have been promulgated, and it is recommended that a review of the legislative requirements is undertaken and the necessary amendments to the reports made. The addendum report (2015) contains no update of the original impact assessment. It is recommended that the report be amended to include an updated impact assessment”. We have seen no response to these comments by the consultants. Failure to consider the new and more appropriate data should disqualify this report from further consideration.

¹²Cowling RM 1997. An environmental management plan for the Thyspunt Nuclear Site. IPC report submitted to ESKOM.

Thyspunt and Duynefontein compared

The question here is: how does one justify the statements in the EIA Report that “...both sites are environmentally acceptable for a nuclear power station” and “The proposed NPS (at Thyspunt) could accordingly be developed without a material reduction in the ecological value (of the site)”. This misinterpretation of the impact assessment verges on the scandalous. Even using their own categorizations and pronouncements, it is clear to any informed reader that the negative impacts on the environment and heritage at Thyspunt are of far greater intensity, extent and consequence than at Duynefontein. The Executive Summary says it all: “The proposed NPS and associated infrastructure will bring about a fundamental change in sense of place at Thyspunt whereas that change has already been experienced at Duynefontein and so were the NPS to be established at Duynefontein, the change would be experienced as a more intense form of the same” and “The Thyspunt site is biologically more diverse than the Duynefontein site and there are more threatened species of fauna at Thyspunt and the Langefonteinvelei wetland is of special importance. As such the site proposed for the NPS at Thyspunt is more sensitive than that at Duynefontein”.

Of course the EIA assessment identified no fatal flaws with the Thyspunt site. But as we have already pointed out, this is because of a cynical manipulation of the information in the specialist reports. Whereas Thyspunt does have fatal flaws, these do not exist for Duynefontein.

Recommended future land use at Thyspunt

We recommend that ESKOM transfers all of its holdings in the Thyspunt footprint to Eastern Cape Parks and Tourism Agency so they can establish a protected area for the exceptional natural and heritage assets that this area houses. These exceptional, even globally unique features, representing a wilderness heritage landscape, are mentioned earlier on in this report. Proclaiming a protected area that safeguards a million years of human history in a landscape that encompasses Critical Biodiversity Areas and provided the foodstuffs for hunter-gatherers, would be consistent with the recommendations from three biodiversity sector plans, namely Eastern Cape Bioregional Plan¹³, Eastern Cape Parks and Tourism protected area expansion strategy, and the Garden Route Initiative. Furthermore, it would allay the concerns of the specialist consultants in the biophysical and heritage realms regarding the impacts on these resources of the “no-go alternative”. It’s the right thing to do.

We recommend that the proposed NPS should be located at Koeberg, which has most of the necessary infrastructure and will absorb the impacts of a NPS with substantially less environmental and social cost. Furthermore, ESKOM should immediately institute a process to identify less costly (in terms of financial, environmental and social criteria) sites located between Nelson Mandela Bay and East London in order to strengthen the Eastern Cape electricity grid.

¹³Berliner D and Desmet D. 2007. Eastern Cape biodiversity conservation plan technical report. DWAF Project No 2005-012. Note that none of these reports is cited in the Botany and Dune Ecology assessment.

Appendix 1: The Garden Route Biodiversity Assessment: the role of the Critical Biodiversity Areas in guiding land use planning¹⁴

The Critical Biodiversity Areas (CBA) map for the Garden Route Initiative (GRI) aims to guide sustainable development by providing a synthesis of biodiversity information to decision makers. It serves as the common reference for all multi-sectoral planning procedures, advising which areas can be lost to development, and which areas of critical biodiversity value and their support zones should be protected against any impacts. As part of the GRI and C.A.P.E. fine scale biodiversity planning, a systematic biodiversity assessment of the GRI was undertaken, and a critical biodiversity area (CBA) map was produced. This biodiversity assessment is used to inform Spatial Development Frameworks (SDFs), Biodiversity Sector plans, Environmental Management Frameworks (EMFs), Strategic Environmental Assessments (SEAs) and the Environmental Impact Assessment (EIA) process. This biodiversity assessment, through the development of a CBA map, is aimed at assisting biodiversity and land use managers and decision makers in this demanding task. This report summarizes the results of the biodiversity assessment conducted.

The CBA map indicates areas of land as well as aquatic features which must be safeguarded in their natural state if biodiversity is to persist and ecosystems are to continue functioning. Land in this category is referred to as a Critical Biodiversity Area. CBAs incorporate: (i) areas that need to be safeguarded in order to meet national biodiversity thresholds (ii) areas required to ensure the continued existence and functioning of species and ecosystems, including the delivery of ecosystem services; and/or (iii) important locations for biodiversity features or rare species.

Ecological Support Areas (ESAs) are supporting zones required to prevent the degradation of Critical Biodiversity Areas and Protected Areas. An ESA may be an ecological process area that connects and therefore sustains Critical Biodiversity Areas or a terrestrial feature, e.g. the riparian habitat surrounding and supporting aquatic Critical Biodiversity Areas.

Those areas of natural vegetation identified on the map as Other Natural Areas are sufficiently extensive at this stage that they may withstand some loss through conversion of their natural state, and undergo development. It is important to note that in the future, such areas will be increasingly converted or impacted, and it is possible that they will eventually be reclassified as Critical Biodiversity Areas. Therefore, in all decision making, the precautionary principle needs to be applied.

¹⁴ Vromans, D.C., Maree, K.S., Holness, S. and Job, N. and Brown, A.E. 2010. The Garden Route Biodiversity Sector Plan for the Kouga and Koukamma Municipalities. Supporting land-use planning and decision-making in Critical Biodiversity Areas and Ecological Support Areas for sustainable development. Garden Route Initiative. South African National Parks. Knysna.