

GreenMatter<sup>ZA</sup> is the engine for growing Biodiversity skills.  
Developing the right people at the right time for the green economy.

# Priority Skills for Biodiversity

2012 UPDATE ON SCARCE AND  
CRITICAL SKILLS

March 2012

**GreenMatter**<sup>ZA</sup>

Strategic Planning

## Contents

1. INTRODUCTION .....	3
2. TERMINOLOGY .....	3
3. PERSPECTIVE.....	4
4. SOURCES.....	6
5. VALUE CHAIN OF BIODIVERSITY RELATED TASKS.....	7
6. CRITICAL SKILLS (Competency Sets) .....	8
7. SCARCE SKILLS (Occupations).....	8
8. RECOMMENDATIONS.....	11
9. POINT OF CONTACT.....	11
10. REFERENCES .....	12

## 1. INTRODUCTION

GreenMatter is a cause that drives transformation and growth in graduate level skills for biodiversity. Co-founding partners SANBI (the South African National Biodiversity Institute) and the Lewis Foundation led the development of a Biodiversity Human Capital Development Strategy (BHCDS) in 2009-2010 (see [www.greenmatter.co.za](http://www.greenmatter.co.za)). The associated programme of implementation by multiple sector partners started in the latter half of 2010.

In 2012 the GreenMatter brand was introduced to reflect the sector wide cause of strengthening management and research skills for all organisations with a biodiversity mandate, interest or impact, in the context of social transformation, skills shortages, and opportunities for growth and employment in the greening of the South African economy.

The development of both the BHCDS and its programme of implementation has been informed by extensive research and stakeholder engagement. This report summarises our current knowledge on biodiversity related skills shortages, based on the best possible data we could feasibly obtain (see Section 4). The report needs to be updated at least annually (HSRC, 2009, p.242) within the GreenMatter Monitoring and Evaluation Framework, with the support of key employers and SETAs (Sector Education and Training Authorities).

*Readers are welcome to help us improve our collective understanding of sector needs by providing feedback on this report in the form of changes or additions, examples, explanations and qualifiers.*

*Please provide substantiated evidence for all contributions. These will be incorporated in an annual review of this report. Contributions should be sent to Dr Eureka Rosenberg contact details on page 11.*

## 2. TERMINOLOGY

In this report and in the processes informing it we have applied Department of Labour (2007) terminology as follows:

- **Scarce Skills** refers to occupations for example, “natural scientists”. The term skill here refers to the ability to perform competently the roles and tasks associated with an

*occupation* based on the Organising Framework for Occupations (OFO). An occupation is a set of jobs or specialisations in which the tasks are so similar that they can be grouped together.

- There is a distinction between **absolute scarce skills**, where South Africa simply does not have enough people who can perform these tasks, and **relative scarce skills**, where we may have competent and qualified people, but still cannot fill positions.
  - **Absolute scarcity** may occur when there is a new or emerging occupation in which there are not enough skilled people (possible example resource economics); when organisations have operational problems (e.g. quality, productivity) as a direct result of lacking skilled people; or there are no people in the pipeline to replace those who leave.
  - **Relative scarcity** occurs when qualified people in the market exist but are not prepared to work in particular jobs or locations; and when there are insufficient numbers of black South Africans to meet equity targets; and when students are in the pipeline but are not yet experienced enough to fill vacant positions.
- **Critical skills** is a term used to refer to competencies required *within* a particular occupation, or across a number of occupations. The Dept of Labour identifies two types of critical skills. These are *generic* critical skills, which would include language and ICT (Information and Computer Technology) skill, and ‘*top up*’ skills where there are new requirements in a specific occupation because of changes in legislation, technology, or mandate.

### 3. PERSPECTIVE

The need to identify scarce and critical skills should be put into perspective by considering the following:

- A number of studies have been undertaken over the years to identify ‘capacity needs’ in relation to biodiversity. However, in the absence of a dedicated SETA, or other sector skills intelligence system feeding into national skills planning, biodiversity related skills have not been comprehensively captured in national sector skills plans prior to the development of the BHCD and associated *Environmental Sector Skills Plan* (Department

of Environmental Affairs, 2010).

- It is difficult to pinpoint and quantify skills needs for a biodiversity sector, for a variety of reasons, some of which are specific to the sector. These reasons include the following:
  - While biodiversity research and conservation agencies have a core mandate focussed on biodiversity, other agencies (like those in the production sectors) have a secondary interest in or an impact on biodiversity only as a result of their core mandate, and if they address biodiversity concerns, it is not as their core mandate. Others (like local government) play a key role in biodiversity management, that is not accurately reflected in their formal mandates. Hence it is difficult to define a biodiversity sector and to choose who to include in surveys of vacancies and future skills needs.
  - In line with the above, graduate level biodiversity specific skills are situated across a range of organisations and sectors and in the private sector e.g. consultancies. There is no list of private sector and not-for-profit organisations that employ biodiversity skills.
  - In many organisations or sub-sectors a biodiversity-related role is combined with broader environmental or generic management roles in the same job – and hence difficult to distinguish in a survey of vacancies. In the official Dept of Labour and StatsSA surveys these (and broader environmental) occupations are grouped together with other occupations and not included in an identifiable (disaggregated) way in these official counts.
  - Organisations use a variety of titles for the same occupations.
  - Organisations find it difficult to predict future skills needs. This seems to be a particularly South African feature not restricted to biodiversity skills. However, the emerging and dynamic nature of biodiversity work also seems to impact this.
  - The use of vacancy data to determine scarce skills is complicated by the fact that some vacancies remain unfilled because of budgetary constraints, not necessarily because the skills are not available in the country. In other cases there may be skills needs that are not reflected as vacancies, because

organisations have not (yet) created the necessary positions.

- Conducting demand side or skills needs surveys involves a complex, expensive methodology (see HSRC recommendations, p.239-242).
- There is no dedicated SETA, overarching professional body or skills intelligence system for the environmental sector, let alone the biodiversity sector, to address any or all of the above. Biodiversity related skills needs are addressed to some extent by the CATHS (Cultural, Arts, Tourism, Hospitality and Sports) SETA alongside a range of other responsibilities. The current SETA system as a whole does not cater well for sectors with a public-good, as opposed to for-profit, focus.

#### 4. SOURCES

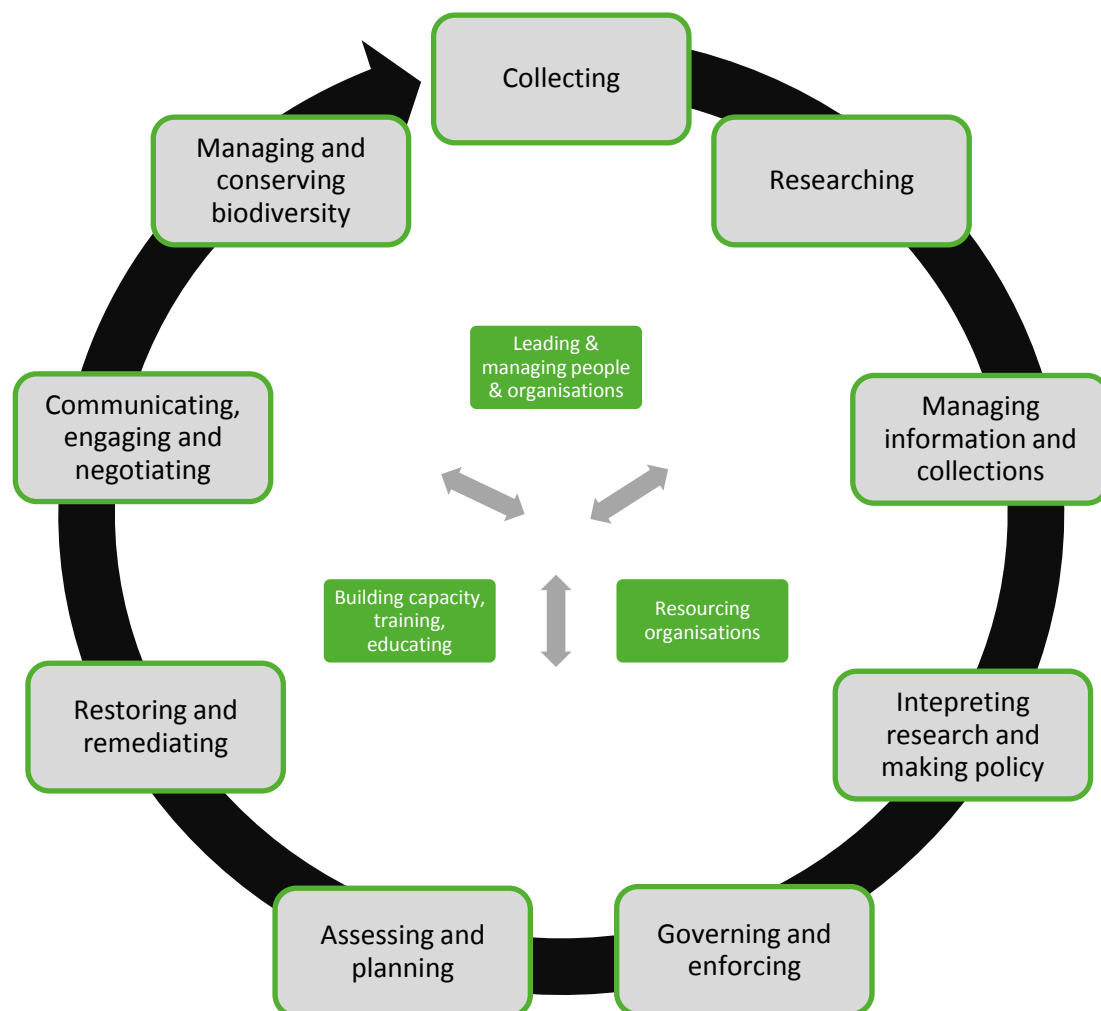
A number of sources (documents, studies and processes) have been used to compile this report. They are listed here, with an indication of the data sources that in turn informed them.

<i>Guidelines for a Human Capital Development Strategy in the Biodiversity Sector, HSRC, 2009</i>	Desk top review of existing studies Stakeholder interviews with sample of organisations (HR and operational staff)
<i>The Biodiversity Human Capital Development Strategy, SANBI &amp; The Lewis Foundation, 2010</i>	Additional desk top reviews of existing studies Additional stakeholder interviews A number of field specific workshops A number of small scale field specific surveys
<i>The Environmental Sector Skills Plan, DEA, 2010</i>	Provincial multi-occupational and multi-organisational workshops Government sector vacancy trend analyses Future Skills Needs Workshop with Department of Science and Technology (DST)
2011-2012 GreenMatter Review	Development of a value chain of biodiversity related occupations; survey in 3 provinces and focus group discussions with sector specialists to review value chain and the BHCDS, 2010 list of scarce skills.
GreenMatter Leadership Consultation	In partnership with the DG Murray Trust, November 2011
GreenMatter Organisational skills needs survey (Up-skilling Study)	Conducted to inform workplace-based professional development initiatives; completed March 2012
<i>Skills for Green Jobs in South Africa, International Labour Office, Skills &amp; Employability Department, Geneva, 2010</i>	Unedited background country study by One World Sustainable Investments, using data from Dept of Labour National Scarce Skills List, 2008

## 5. VALUE CHAIN OF BIODIVERSITY RELATED TASKS

The framework below is useful for recognising the scope of occupations that participate in the value chain of studying, conserving, utilising, restoring and managing biodiversity in protected areas as well as urban and production landscapes. Note that it does not fully illustrate the *relationships* between the various roles and functions, which would require a more comprehensive systems mapping.

**Figure 1: Biodiversity Science and Management Value Chain**



## 6. CRITICAL SKILLS (Competency Sets)

Figure 2 summarises competencies that various sources consistently identified as both necessary, and generally in short supply, within and across a variety of occupations, including technical/professional and managerial occupations. These skills are needed across levels within organisations, but particularly at the middle to senior levels.

**Figure 2: 2012 List of Critical Skills Required Within and Across Several Occupations**

Leadership skills	Management skills	Enabling skills	Integration skills	Adaptive skills
<ul style="list-style-type: none"> <li>• Specific focus on leadership associated with senior and enabling positions in organisations as well as sector</li> <li>• Identified during ESSP, BHCD consultations; confirmed in GreenMatter Leadership consultation and Upskilling survey</li> </ul>	<ul style="list-style-type: none"> <li>• Sources tend to combine leadership and management skills but recognise that they are related but also distinct</li> <li>• Identified in same contexts as Leadership</li> </ul>	<ul style="list-style-type: none"> <li>• Social learning facilitation, communication, knowledge brokering and advocacy; mentoring or role modeling</li> <li>• Identified during ESSP, BHCD consultations, Future Scenarios Workshop with DST; confirmed in 2011-2012 review</li> </ul>	<ul style="list-style-type: none"> <li>• Across fields, disciplines, sectors and interests</li> <li>• Identified during ESSP, BHCD consultations; Future Scenarios Workshop; confirmed in 2011-2012 review</li> </ul>	<ul style="list-style-type: none"> <li>• Ability to work in contexts of uncertainty and complexity; critical thinking; systems thinking</li> <li>• Identified during ESSP, BHCD consultations; Future Scenarios Workshop; Leadership consultation</li> </ul>

## 7. SCARCE SKILLS (Occupations)

The lists in Figures 3 and 4 are working lists to guide GreenMatter decision making. They should be updated at least annually, using a variety of sources and a methodology based on rigor and pragmatism (see HSRC recommendations in this regard).

Before the list can be used optimally, further HCD research is required to determine the nature and where possible the scope of the scarcity, to confirm potential employers, and to explore the most suitable interventions, drawing on lessons learnt from past and current actions. For example: In some cases causes may be in the conditions of employment, in which case the allocation of bursaries will not suffice. Where such exploration has been done, proposed interventions are listed.

To the best of our knowledge, at the start of 2012, the following occupations are scarce skills:



**Figure 3: Scarce Skills in Biodiversity (Absolute Scarcity) – 2012 (Alphabetical Order)**

Scarce Skills	Sources of Information	Proposed/Possible Interventions
1. <b>Agricultural extensionists</b> with biodiversity specialism	BHCDS stakeholder consultation and Natural Resource Management Sector scoping exercise (WWF)	Lobby for and enable the inclusion of high quality biodiversity and extension content in existing training for extensionists and agriculturalists?
2. <b>Curators</b> of biodiversity collections	BHCDS stakeholder consultation, confirmed during 2011-2012 review and Jobs Fund partners meeting	Employment conditions in museums is a major stumbling block; past NRF bursaries were not effective
3. <b>Ecologists:</b> esp. in marine but also aquatic and terrestrial systems; Environmental Manager, Conservation and Environmental Scientist	BHCDS stakeholder consultation, NRF ratings); National Wetlands Forum, 2009 consultative workshop, Jobs Fund partners meeting, ILO study, confirmed in 2011-2012 review. 168 NRF-rated terrestrial biologists; 34 NRF-rated marine biologists; only four NRF rated researchers listed themselves as Ecosystem services or Biodiversity Conservation Specialist.	General improvement in the quality of courses; Jobs Fund for interns; Youth Challenge; Workplace-based Up-skilling; ... Bursaries in priority areas: marine, aquatic, wetlands, ...
4. <b>Engineers</b> (civil) with biodiversity specialism	BHCDS stakeholder consultation, ILO study, Jobs Fund partners meeting	Lobby for and enable the inclusion of biodiversity content in existing civil engineering training; consider the development of specialist courses with e.g. international expertise? (university based programme)
5. <b>Geneticists:</b> Genomic investigator, molecular biologist, molecular geneticist, molecular biologist	Identified in 2011-2012 review: There are 39 NRF rated scientist in biotechnology but all are focusing on the economic aspects of biotechnology. One researcher on environmental ethics, is not a molecular biologist	Bursaries for a specific biodiversity focus linked to a new university-based research programme?
6. <b>GIS</b> specialists in particular, but also GIS technicians	ESSP and BHCD consultations, Up-skilling survey	
7. <b>HCD:</b> High level biodiversity education and HCD specialists, human resource & training professionals	ESSP consultation, DST Future Skills Workshop, NRF commissioned education research study, ILO study, Jobs Fund partners meeting	M.Ed., M.Phil. & PhD bursaries at current centres of expertise; strengthen current centres of expertise and increase their number
8. <b>ICT</b> specialist and technicians with biodiversity skills: Service Managers, systems analysts, web and multimedia developers, applications programmers,	BHCDS workshop (BIMF); Up-skilling survey; national shortages and decline in numbers reported in separate HSRC study	Further consult Biodiversity Information Management Forum (BIMF)

database designers and administrators		
9. <b>Lawyers</b> with environmental specialism, legislators	BHCDS and ESSP consultations, ILO study	Lobby for and enable the inclusion of biodiversity content in existing legal training; consider the development of specialist post-grad courses with e.g. international expertise? (university based programme)
10. Monitoring specialists, species protection officers and inspectors	BHCDS consultation, confirmed in Up-skilling survey, Jobs Fund partners meeting, 2011-2012 review.	See workplace-based up-skilling report for recommended training strategies and interventions
11. Policy developers & analysts; urban and regional planners with biodiversity insight	BHCDS stakeholder consultation, ILO study, confirmed during 2011-2012 review	Policy: Planning: Lobby for and enable the inclusion of biodiversity content in existing training
12. Resource economists with biodiversity related specialism	Identified (with some qualifications) in BHCDS consultation, confirmed in 2011-2012 review and Jobs Fund partners meeting	Probe further to determine magnitude of need, extent to which universities are addressing it
13. Social scientists specialising in environment; Intellectual property & indigenous biodiversity knowledge specialists	BHCDS stakeholder consultation; NRF ratings: Only 7 rated scientists in the humanities focus on environment (ethics, history, governance). An ASSAF report (Jansen & Vale, 2011) states that SA's Humanities are in decline and need urgent intervention	Rhodes' DST social learning chair application was unsuccessful; follow up
14. Soil scientists	BHCDS stakeholder consultation, NRF ratings, confirmed in 2011-2012 review	Cost of training seems prohibitive; combine with agriculture where funding is stronger?
15. Statistical ecologists & modelers	BHCDS stakeholder consultation, NRF ratings, confirmed in 2011-2012 review	UCT's DST application was unsuccessful; follow up
16. Taxonomists, systematists for marine and terrestrial systems	BHCDS stakeholder consultation, SABI <i>State of the Nature of Biosystematics in SA</i> , Jobs Fund meeting, confirmed in 2011-2012 review	Investigate further, use lessons learnt from past interventions and current focus on DNA barcoding-based taxonomy

**Figure 4: Scarce Skills/Occupations in Biodiversity (2012) – Relative Scarcity**

Biodiversity monitors in marine and other ecosystems	Identified during BHCDS stakeholder consultation, confirmed during Jobs Fund partners meeting; marine sector lost staff and positions due to loss of funding
EIA practitioners	Identified during ESSP and BHCDS stakeholder consultation, confirmed during 2011-2012 review; numbers graduate but often not with the necessary skills. Coastal EIA practitioners a particular need in relation to new Integrated Coastal Management Act
Protected area managers	Identified during BHCDS stakeholder consultation, confirmed during 2011-2012 review; numbers graduate but often not with the necessary skills, or willing to work in remote locations
Social ecologists	Identified during BHCDS stakeholder consultation; graduates not prepared to work in remote locations; or lack some of the necessary skills
Wildlife veterinarians	Identified during BHCDS stakeholder consultation; not enough black and/or female professionals willing to work under rugged conditions

## 8. RECOMMENDATIONS

- Regard this list as indicative.
- Update it regularly (e.g. annually) using sound processes and data sources that optimally combine rigor and pragmatism (see HSRC guidelines).
- Undertake further, phased HCD research to investigate each scarce skill in turn; determine the reasons behind and nature and scope of the scarcity, the potential employers, the study pathways, the lessons learnt from past and current initiatives to address the scarcity. Document these findings and use them to inform future sector wide GreenMatter interventions.
- Produce an description of each of the listed scarce skills – what these occupations entail and the study and career paths which lead to them – which can be used in a range of communication processes and interventions including career guidance.

## 9. POINT OF CONTACT

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## 10. REFERENCES

Department of Labour, 2007. *Draft Framework for Identifying and Monitoring Scarce and Critical Skills*. Pretoria, Department of Labour.

HSRC, 2009. Vass, JR et al. *Guidelines for a Human Capital Development Strategy in the Biodiversity Conservation Sector*. HSRC, Pretoria.

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