

A Human Capital Development Strategy for the Biodiversity Sector 2010 - 2030



Produced with stakeholder engagement
by SANBI
and the Lewis Foundation



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LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|----------|--|
| BHCDS | Biodiversity Human Capital Development Strategy |
| BIMF | Biodiversity Information Management Forum |
| C.A.P.E. | Cape Action for People and the Environment |
| CHE | Council on Higher Education |
| CSIR | Council for Scientific and Industrial Research |
| DBE | Department of Basic Education |
| DEA | Department of Environmental Affairs (formerly DEAT) |
| DEAT | Department of Environmental Affairs and Tourism |
| DHET | Department of Higher Education and Training |
| DL | Department of Labour |
| DST | Department of Science and Technology |
| DTI | Department of Trade and Industry |
| DWAF | Department of Water Affairs and Forestry |
| DWA | Department of Water Affairs (formerly DWAF) |
| ELF | Environmental Learning Forum |
| EMIS | Education Management Information System |
| ESSP | Environmental Sector Skills Plan |
| EWT | Endangered Wildlife Trust |
| FET | Further Education and Training |
| GIS | Global Information System |
| HCD(S) | Human Capital Development (Strategy) |
| HE | Higher Education |
| HEI | Higher Education Institution |
| HEMIS | Higher Education Management Information System |
| HR(D) | Human Resources (Development) |
| HRDC | Human Resources Development Council |
| HRDS | Human Resource Development Strategy for South Africa |
| HSRC | Human Sciences Research Council |
| IAIA | International Association for Impact Assessment |
| IPAP | Industrial Policy Action Plan |
| IPBES | Intergovernmental Platform for Biodiversity and Ecosystem Services |
| MCM | Marine and Coastal Management (now Oceans and Coastal Management) |
| MTSF | Medium Term Strategic Framework |
| NBF | National Biodiversity Framework |
| NBSAP | National Biodiversity Strategy and Action Plan |
| NEMA | National Environmental Management Act |
| NIPF | National Industrial Policy Framework |
| NPO | Not for Profit Organisation |
| NRF | National Research Foundation |
| NRM | Natural Resource Management |
| NSA | National Skills Authority |
| NSDS | National Skills Development Strategy |
| NQF | National Qualifications Framework |
| OFO | Organising Framework for Occupations |
| SACNASP | South African Council for Natural Scientific Professions |
| SAEON | South African Environmental Observation Network |

| | |
|----------|---|
| SANBI | South African National Biodiversity Institute |
| SANCCOB | Southern African Foundation for the Conservation of Coastal Birds |
| SANParks | South African National Parks |
| SAQA | South African Qualifications Authority |
| SETA | Sector Education and Training Authority |
| SIC | Standard Industrial Classification |
| SO | Strategic Objective |
| SOC | Standard Occupational Code |
| SSP | Sector Skills Plan |
| QCTO | Quality Council for Trades and Occupations |
| WESSA | Wildlife and Environment Society of South Africa |
| WSP | Workplace Skills Plan |
| WWF | World Wildlife Fund |

EXECUTIVE SUMMARY

All organisations involved in biodiversity conservation, research and management in South Africa need to participate in strengthening and transforming the sector. Conservation agencies, research institutes, government departments, private companies and not-for-profits with a biodiversity mandate all need capable and qualified managers, conservators or researchers, and to help increase the number of black South Africans in leadership positions for these functions.

This Human Capital Development Strategy (HCDS) aims to contribute, over the next 20 years, to the growth of an equitable and skilled workforce of biodiversity professionals and technicians to optimally implement the sector's expanding and increasingly complex mandate. A response to Strategic Objective 2 of the National Biodiversity Framework of 2007, the HCDS is an initiative of the Lewis Foundation, which funded its development, and the South African National Biodiversity Institute (SANBI), which had been mandated by the then Department of Environmental Affairs and Tourism (now DEA) to provide strategic leadership for capacity development and transformation in the sector. The strategy has been informed by a sector analysis, undertaken by the Human Sciences Research Council (HSRC), additional stakeholder consultations and research. This document represents not a final product, but a 'living strategy' that will be reviewed every five years through continued stakeholder engagement (see www.skillsforbiodiversity.org.za).

The HCDS provides a framework through which organisations can strengthen their human capacity to deliver on their biodiversity mandates and meet their transformation objectives. Biodiversity organisations can use the framework to design internal HCD strategies, but can also directly benefit from and contribute to the strategy. The HCDS provides a means for organisations across the sector to contribute in a concerted manner to skills matters which affect them individually and collectively. It aims to strengthen existing initiatives through greater coordination and synergy, and to address gaps in the national skills planning system, through sector-wide initiatives. While the implementation plan includes interventions that are not always novel, the innovation of the Biodiversity HCDS lies in its systemic approach, which provides mechanisms for connection, coordination and periodic evaluation across the sector, as well as sector-wide initiatives that have thus far been limited.

The focus of this strategy is a greater pool of biodiversity professionals and technicians, and in particular (but not exclusively) black South Africans, with high level skills (level 6 and up on the National Qualifications Framework) to undertake biodiversity conservation, management and related natural and social science research, and play a leadership role in organisations with a biodiversity mandate. The Biodiversity HCDS is complemented by other strategies with a broader ambit. It is closely aligned, for example, with the Environmental Sector Skills Plan and Environmental HCDS (ESSP, DEA, 2010) which address skills needs at all levels, including entry-level skills, across sub-sectors in the environmental sector.

The HCDS consists of three strategic goals and seven strategic objectives for achieving the vision of skilled and equitable biodiversity leadership. These address all aspects of the HCD 'pipeline', from entry into the sector via educational institutions, to retention in the workplace, and national provisions to enable institutions and organisations to be more effective in their capacity development endeavours.

Associated activities include (but are not limited to) the following:

1. A national career guidance plan and a suite of resources and interventions to inform youth, teachers, students and student advisory bureaus about biodiversity study and career options and requirements.
2. Bursaries and bursar support programmes in scarce skills and niche areas.
3. Considering support for the establishment of centres of excellence for Biodiversity Informatics and Biodiversity Statistics through partnership initiatives.
4. A national biodiversity internship and student placement programme.
5. Mechanisms for improving the quality and relevance of undergraduate curricula and pass rates and facilitating entry into post-graduate study.
6. Investigating the quality, relevance and scope of existing inter- and trans-disciplinary university courses, towards a possible new Masters course in Conservation Leadership.
7. Up-skilling and mentoring programmes to improve the qualifications, skills and sense of belonging of staff already in the sector.
8. A network, courses and resources for Human Resource practitioners, to strengthen organisations' skills planning practices and ability to retain talented staff.
9. Engaging the national skills planning and development, education and training system to better provide for the sector's needs.
10. An annual Skills Summit to monitor progress and provide a platform for dialogue and actions to address collective concerns across organisations and sectors.

The Lewis Foundation is providing R8,5 million over three years to kick-start implementation in July 2010. The HCDS includes an implementation plan for the first two years with guidelines for monitoring and evaluation. These tend not to include quantitative targets, as the strategy is focussed more on the drivers (of transformation), than on the intended targets (numbers of graduates, for example). For some activities details are provided. For other activities details must be worked out. To this end, an implementation team will undertake focused investigations and further stakeholder engagements, which may also identify new activities to achieve the strategic objectives.

A number of consultative forums have been set up, as follows:

- Higher Education Working Group
- Human Resource Development Network
- National Environmental Skills Planning Forum
- National Curriculum Task Team
- Career Guidance Working Group.

The strategy's implementation architecture combines mechanisms for broad sectoral participation, with a dedicated coordinating mechanism to drive and monitor implementation. The latter consists of a programme director based in SANBI to lead implementation; a strategic advisor; a fund raiser to leverage additional income for projects; communications and administrative support. The former will comprise a team of project executants, many of whom will be staff in organisations across the sector, implementing and monitoring programme activities. An advisory group with relevant expertise from a range of organisations will provide additional guidance at a strategic level.

A first full review of programme implementation and impact should be undertaken in the latter half of 2012. During the five-year review of the strategy, changing contexts should be taken into account. For instance, race and gender-based equity targets need to be reconsidered, in the light of progress.

CHAPTER ONE: INTRODUCTION

1.1 PURPOSE OF THE DOCUMENT

This Strategy Document and Implementation Plan has the following roles:

- A communications tool to provide stakeholders and potential partners with information on the BHCS, to encourage involvement.
- An implementation framework to guide the implementation team in what projects to develop, implement and monitor, why (sector analysis) and how (underlying principles).
- A planning framework on which to base communication and funding plans.
- A developmental tool that identifies areas for further consultation, research and development.
- A monitoring and evaluation guide, providing both principles and criteria to help stakeholders to assess whether the sector is making progress towards human capacity development and transformation.

1.2 BACKGROUND AND RATIONALE

The two lead partners in the development of the Biodiversity Human Capital Development Strategy (BHCDs) are SANBI (the South African National Biodiversity Institute) and the Lewis Foundation. Their decision to embark on this process was informed by the following:

In 2007 the National Biodiversity Framework documented the need for a capacity building programme within the biodiversity sector to address transformation, and identified DEAT, SANBI, SANParks, provincial conservation agencies, higher education institutions and relevant SETAs as the key role players, to develop and implement such a plan by 2010. The NBF had taken its cue from the National Biodiversity Strategy and Action Plan (NBSAP, 2005, p.80) which has the following Strategic Objectives:

- SO 2.1: The biodiversity sector is transformed and representative of South African society.
- SO 2.3: Institutions with biodiversity-related responsibilities are effective and adequately capacitated.

DEAT mandated SANBI to take the lead, and SANBI set itself the organisational strategic objective to become the lead agency for human capital development in the biodiversity sector.

SANBI then found a key partner in the Lewis Foundation, formerly known as the Tony and Lisette Lewis Foundation. The trustees of the Foundation, one of the largest private funders of conservation activities in South Africa, had decided to pursue a more consolidated and strategic funding focus. In 2008 they had interviewed and consulted key thinkers in conservation organisations, who consistently identified capacity building to strengthen the skills base in the sector as the most critical current need in conservation.

The Foundation teamed up with SANBI to embark on the development of the BHCDS. In April 2009 they appointed a research agency to conduct a sector analysis, and a coordinator to lead stakeholder engagement and formulate a strategy and implementation plan. This development phase was funded by the Lewis Foundation.

A draft strategy was launched on 1-2 December 2009, after which the Foundation committed additional funding to appoint staff to ensure that the strategy is implemented and further developed. This grant includes start-up funding for getting the first implementation projects underway, as well as the appointment of a fundraiser to raise further funding. Details about the implementation architecture can be found in Chapter 7, while Chapter 5 outlines activities to be developed into projects.

The next sections provide information on the process followed to inform the contours and details of the strategy, and the BHCDS's alignment with related strategies. Phase I of the project (April 2009 – May 2010) consisted of strategy development, and will be followed by Phase II, implementation, from July 2010. In reality there has been some overlap, with some implementation initiatives already starting in Phase I, and a need for consultation and development to continue in Phase II. Phase I had two distinct (but also overlapping) components, namely research by the Human Sciences Research Council (HSRC), and stakeholder engagements by the consultant who had been appointed to lead the strategy development. These two components are described next.

1.3 PROCESS OF STRATEGY DEVELOPMENT

1.3.1 Research

SANBI and the Lewis Foundation appointed the HSRC to inform the HCDS through a sector analysis. The HSRC research took place from April – October 2009 and included a situational analysis, a supply and demand side analysis and a gap analysis. These were based on desktop reviews, interviews with biodiversity managers and senior human resource practitioners in a statistically defensible sample of organisations across the sector, and a small number of workplace skills plans. The HSRC also referred to data collected by a research team led by Rhodes University, to inform the Environmental Sector Skills Plan (DEA, 2010) – see 1.4.

Based on their findings the HSRC team drew up a list of scarce skills and an extended set of recommendations (see Chapter 3), which have informed this strategy. For a detailed report on the findings and a further description of the research methodology, please refer to Vass et al. (2009), available from www.skillsforbiodiversity.org.za.

The HSRC cautioned that their study, in particular the gap analysis, was hampered by the limited availability of data, and the poor quality of some of the available data. These constraints relate to factors ranging from the 'invisibility' of the biodiversity (and broader environmental) sector in official statistics; to differences in job titles used across organisations; the limited availability of well-considered workplace skills plans in the organisations in the sector; and the poor quality of skills related information in general, in South Africa¹.

¹ In South Africa, skills planning across sectors is hampered by a lack of comprehensive, reliable data and a lack of suitable methods to apply to the available information (Erasmus, 2009; Vass et al., 2009).

These limitations mean that there are still gaps in our understanding of skills shortages in the biodiversity sector and the factors which drive skills shortages, and the HSRC identified several areas that need further investigation. This includes a refinement of their list of scarce skills.

The limitations of the research point to weaknesses in the national skills planning and development architecture, and weaknesses in organisational-level skills and human resource development planning as well as monitoring, in the sector. These weaknesses are addressed in this BHCDS, for they significantly reduce the sector's ability to advance and measure the growth and transformation of its skills base.

In addition to the HSRC's research, the BHCDS was also informed by a series of educational quality studies that were conducted on behalf of the ESSP, by a team led by the BHCDS development coordinator. These studies probed the quality and relevance of educational provisioning and career guidance in South African schools (Rosenberg et al., 2009a and 2009c); and educational provisioning in the Higher Education sector (Rosenberg et al., 2009c), with specific reference to environment-related programmes².

1.3.2 Stakeholder Engagement

In addition to the HSRC's research interviews, the strategy development consultant engaged biodiversity stakeholders in the following ways:

- Consultative workshops (9 in total), on higher education (2); human resource development (2); biodiversity information management; wetland management; schools; career guidance; and forecasting for the environmental sector skills needs
- Individual interviews (12) and small group meetings (5)
- Small questionnaire survey (only one, as this proved to be an unsuccessful method)
- The development of a website where interim research findings and drafts of the strategy were posted for comment
- Updates on strategy developments and calls for comment circulated to a database of some 300 individual stakeholders
- The launch of the draft BHCDS in December 2009, attended over two days by some 140 individuals.

The following interest groups and organisations³ were directly consulted:

- BIMF (the Biodiversity Information Management Forum)
- C.A.P.E. Capacity Development Programme
- C.A.P.E. Resource Economics Forum
- Conservation planning (across municipal and agriculture contexts)
- DEA - Marine and Coastal Management (MCM, now Oceans & Coastal Management)
- Environmental impact assessment community
- Higher Education representatives from several universities
- Human Resource/HR Development practitioners
- SANBI - Biodiversity Information Management
- SANBI - Climate Change

² These studies are also available on www.skillsforbiodiversity.org.za.

³ Others, for example, more research institutes, more NPOs, local government and provincial departments, had opportunities to participate, e.g. in workshops and in the launch of the BHCDS.

- SANBI - Marine Programme
- SANBI and University of Cape Town – Statistical ecology and animal demography
- SANBI - Training and research support
- SANCCOB
- SANParks - Research
- SANParks - Management
- SANParks -Training, transformation and HRD
- National Wetlands Forum
- WESSA - Mondi Wetlands Programme.

The following forums have been set up, in partnership with agencies like DEA, DST and WWF, for further consultation and development work:

- Higher Education Working Group
- Human Resource Development (HRD) Network
- Schools and Curriculum Task Team
- Career Guidance Forum
- National Environmental Skills Planning Forum.

The consultative process has started to roll into implementation in a number of instances. It was necessary to engage the Ministry of Basic Education on a national curriculum revisioning process announced in late 2009, and to respond to a call from the Ministry of Higher Education and Training in April 2010, for comment on the revised SETA landscape and proposed new National Skills Development Strategy (NSDS III). A request for career guidance materials to be developed for a Biodiversity Expo in April 2010 was heeded and a workshop towards a national career guidance plan was convened in May. The first meeting of a Human Resource Development Network has also been held in May 2010, to maintain momentum following consultations at the launch of the draft BHCDS in 2009. These initiatives are included in the implementation plan (Chapter 8) as they provide useful starting points for various implementation projects.

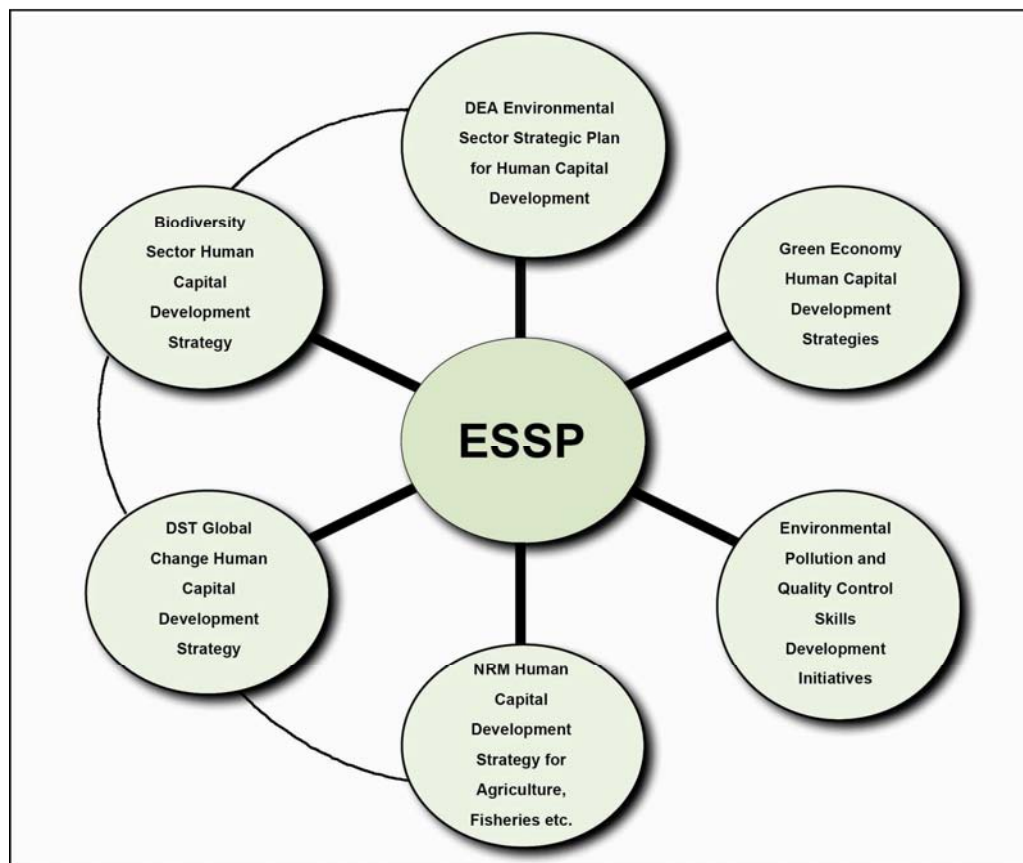
While the lead agencies for capacity development in the biodiversity sector as identified in the NBF have all been included, a number of broader stakeholder groups are still under-represented in the stakeholder consultations, and the communication plan to be formulated in the implementation phase should include ongoing stakeholder engagement, not only with those individuals and organisations who are already involved in strategy formulation and implementation, but also with organisations and sub-sectors that have not yet participated. These include:

- Private employers with a biodiversity focus or mandate
- Museum and herbarium staff, taxonomists and curators
- More representatives of northern universities and universities of technology
- More provincial conservation agencies and parastatals.

1.4 ALIGNMENT WITH OTHER STRATEGIES

Between 2008 and 2010 a number of human capital development initiatives relevant to the BHCDS, were underway. The BHCDS was developed in alignment with these initiatives, through participation in various forums including a National Environmental Skills Planning Forum. These initiatives are outlined below, and relationships are illustrated in Figure 1.1.

Figure 1.1: Core Environmental Sector Skills Plan informing a range of HCD strategies



1.4.1 The C.A.P.E. Capacity Building Programme

The BHCDS drew on the approach developed for and lessons learnt in the initiatives piloted in the C.A.P.E. programme (Raven, 2008), for example its institutional strengthening pilot with conservation agencies in the Eastern and Western Cape, and the trialling of its career guidance resource and programme in schools in these provinces.

1.4.2 The Environmental Sector Skills Plan and Ministerial Performance Agreement

The ESSP (DEA, 2010) is a core skills planning guide for the environmental sector as a whole and indeed all sectors, and the BHCDS is closely aligned with the principles and directions advanced in the ESSP. The research conducted by a team led by Rhodes University's Environmental Education and Sustainability Unit on behalf of the DEA to inform the ESSP and its associated HCDs, was invaluable in supplementing the HSRC study, as was the ESSP research into issues of quality and relevance of educational provisions for science and environment, across the human capital development pipeline (Rosenberg et al., 2009a, b, c).

A Performance Agreement that takes effect in 2010 commits the Ministry of Water and Environmental Affairs to implement the ESSP in full by 2014, to address scarce and critical skills gaps, under Outcome 10, the *Protection and enhancement of environmental assets and natural resources*. Outputs relevant to this outcome include *Sustainable environmental management* (Outcome 3) and *Biodiversity protection* (Outcome 4).

While no detailed targets had been set for the implementation of the ESSP, the Agreement refers to the following changes required in existing institutional and other arrangements:

- Agreements with educational institutions for formal and informal enhancement of skills including conservation scientists, engineers, GIS specialists, planners and data managers
- Educational institutions to align their curricula with current conservation imperatives
- Enhanced collaboration with SETAs and accreditation institutions to integrate skills relevant for implementation
- Strategy to retain scarce skills and Occupation Specific Dispensation for technical experts including forest ecologists.

1.4.3 The Global Change Grand Challenge HCDS

The Department of Science and Technology’s Global Change Grand Challenge (DST, 2010) is a research programme based on six themes, and an associated HCDS. The six research themes include a number of focal areas relevant to the biodiversity sciences (see Figure 1.2). There are thus overlaps (as well as differences) in goals, content and participating organisations between the Global Change HCDS and the Biodiversity HCDS, and the BHCDS has been developed with this in mind. At the time of this document being published the DST has not yet approved the draft Global Change HCDS, and this has limited opportunities for synergy in project details. Ongoing collaboration must seek to avoid duplication and maximise synergy.

Figure 1.2: DST’s Global Change Grand Challenge research themes

| A Understanding a changing planet | B Reducing the human footprint | C Adapting the way we live | D Innovation for sustainability |
|--|--|---|--|
| <ol style="list-style-type: none"> 1. Observation and monitoring 2. Dynamics of the oceans around southern Africa 3. Dynamics of the complex internal earth systems 4. Linking the land, air and sea 5. Improving model predictions at different scales | <ol style="list-style-type: none"> 1. Waste minimisation methods and technologies 2. Conserving biodiversity and ecosystem services 3. Institutional integration to manage ecosystems and ecosystem services 4. Doing more with less | <ol style="list-style-type: none"> 1. Preparing for rapid change and extreme events 2. Planning for sustainable urban development in a South African context 3. Water security for South Africa 4. Food and fibre security for South Africa | <ol style="list-style-type: none"> 1. Dynamics of transition at different scales – mechanisms of innovation and learning 2. Resilience and capability 3. Options for greening the developmental state 4. Technological innovation for sustainable social-ecological systems 5. Social Learning for sustainability, adaptation, innovation and resilience. |

1.4.4 Towards an HCD for Natural Resource Management

Research into HCD needs associated with natural resource management in Fisheries, Agriculture, Forestry and related industries is currently being undertaken (Raven, 2010). The study was commissioned by WWF in response to a concern that the Biodiversity HCDS will not address the need for skills in these commercial sectors that approach biodiversity from a *use* rather than a research and conservation point of view – the same entity (grass, or fish) is here not labelled ‘biodiversity’, but ‘natural resource’. It seems useful to distinguish between these approaches (and associated practices) partly because it makes for more focussed, manageable and measurable strategies, and partly because the funding for skills development in the different fields (biodiversity conservation or natural resource protection) may come from different sources, the latter having a more overt economic focus.

However, there are clearly both conceptual and practical overlaps. For example, biodiversity conservation in agriculture can be achieved by keeping pockets of farm land out of production, as in the stewardship contracts promoted by conservation agencies, but biodiversity protection can also be achieved through measures undertaken during production, such as reducing the use of water and pesticides or retaining strips of natural vegetation when ploughing fields. The latter approach, called conservation farming, has been researched by SANBI, a biodiversity organisation. In addition ‘mainstreaming’ conservation planning for biodiversity protection into agricultural training, extension, marketing and regulation are important goals of organisations like SANBI and WWF.

As with the Global Change Grand Challenge, collaboration with the WWF-driven research process must be undertaken to avoid duplication and maximise synergy. The provisions for environmental skills planning formulated in the new SETA landscape may be critical in determining whether one or more strategies would be most appropriate.

Another consideration is the fact that the BHCDs focuses on high level skills development only, which rules out attention to intermediate and lower level skills needs that span biodiversity conservation and natural resource management (e.g. sustainable harvesting of indigenous plants, or wetland rehabilitation). Additional strategies may well be required, with perhaps a common meta-mechanism for measuring progress across strategies. The Annual Skills Summit recommended in the BHCDs can play a role here, as can a set of common indicators in monitoring and evaluation frameworks.

1.5 A NOTE ON TERMINOLOGY: SKILLS

In this strategy the term “skills” is used in various ways, aligned with general usage in the HCD literature. The term is used to refer to a combination of knowledge, values and skills which enable individuals to do their work. It is also used to refer to skilled personnel, and to occupations. The term *scarce skills* is used to refer to particular occupations; for example, the occupation of taxonomy is considered a scarce skill. The term *critical skills* is used to refer to skills (competencies) required within an occupation, and essential to that occupation, e.g. the skill of applying relevant environmental legislation with the occupation of impact assessment practitioner.

CHAPTER 2: APPROACH TO THE STRATEGY

2.1 A SYSTEMIC APPROACH TO CAPACITY DEVELOPMENT

The strategy commissioned by SANBI and the Lewis Foundation is termed a *human capital development* strategy, in keeping with current usage in other sectors, and by government in particular. The concept of human capital development in its original form is however not applicable here, as it refers to a drive to increase the educational levels of individuals, in order to increase their direct contribution (dollar value) to an economy⁴. This has not been the approach driving the Biodiversity Human Capital Development Strategy.

The BHCDS is focussed on increasing the skills (competencies, and not only qualifications) of individuals in order to enable them *to better meet biodiversity goals*. The BHCDS also recognises that it is not only the skills of individuals that determine whether they can achieve biodiversity objectives, but also the enabling conditions within organisations, which play a role in whether individuals are appointed, retained and deployed in particular functions, and also affect whether they are able to execute those functions effectively.

The BHDS therefore addresses both individuals' skills, and organisations' ability to retain and effectively utilise those skills⁵.

This Strategy is also premised on the fact that the quality and relevance of skills that individuals bring to the workplace are influenced by the quality and relevance of their education and training (and not simply by levels of qualifications). Thus factors in the schools and higher education institutions producing skills for the biodiversity sector are also relevant to the BHCDS. The C.A.P.E. Capacity Development Programme produced an illustration of what has come to be known in the programme as a systemic approach to capacity development, which is also used in this strategy (see Figure 2.1).

Alternative labels that could have been used for the BHCDS include a Human Resource Development Strategy or a Human Capacity Development Strategy, and the latter term should perhaps be favoured in future. The term 'capacity development' was popular and useful in the past two decades, but had unfortunately come to be associated with a North-South deficit discourse sometimes found in international development aid contexts.

For now the title used in the original terms of reference has been retained in keeping with common usage, given that, as Vass et al. (2009) point out, the concept is used in a variety of ways in the South African context, and is seldom meant to imply its original meaning.

⁴ For a review of ways in which the concept of human capital development has been used, see Vass et al., Chapter 1, 2009.

⁵ The BHCDS does not, however, address the availability of technologies and resources to enable effective skills application, as reflected in current use of the concept *capability* (skills + technology).

Figure 2.1: A Systemic Approach to Capacity Development
(adapted from Raven, 2009)



2.2 FOCUS: HIGH SKILLS

It is important to note that this HCDS for the biodiversity sector focuses on high level skills. This involves roles played by professionals and associated professionals or technicians who are qualified at Level 6 or higher on the National Qualifications Framework (NQF); that is, with a national diploma, first degree or higher degree. This focus is the result of the specific rationale for this strategy, in which transformation in the form of racial redress is prominent. The two primary issues to which the strategy had to respond (as outlined in the NBF, 2007) are as follows:

- At senior levels and in leadership positions in the biodiversity sector there is no social equity, as by far the majority of these roles are played by white men. Gender equity is important, but even more important, given South Africa's history, is racial equity.
- There are some scarce skills in the sector – organisations find it difficult to fill certain vacancies. These vacancies tend to be for specialist high level scientific, technical and managerial skills.

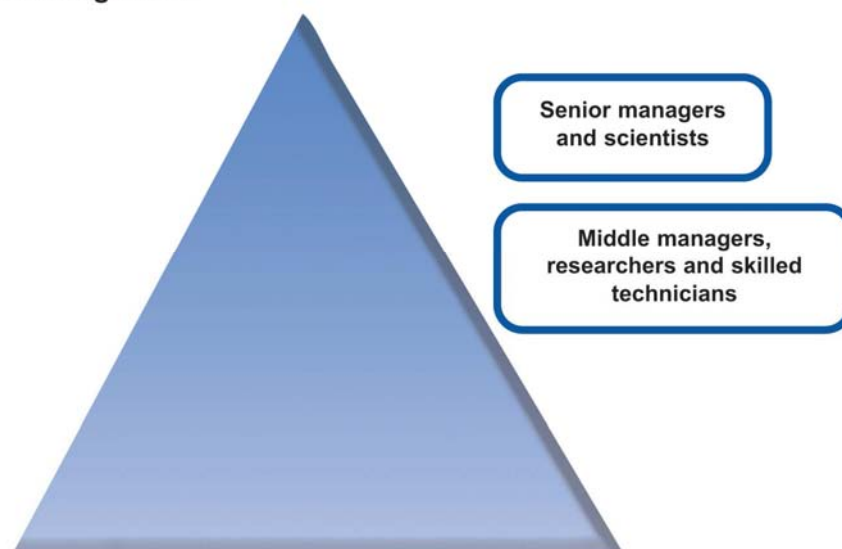
For these reasons, SANBI and the Lewis Foundation decided to focus the BHCDS on high level skills. Here, it was felt, was the greatest need for transformation⁶.

Research indicated that this was indeed the case (see Chapter 3). It is also at the management level where there are high turnover rates, and where biodiversity

⁶ Note that with regard to entry level skills, the majority of employees in the environmental sector are black South Africans.

organisations find it most difficult to retain staff, in the face of competition from commercial companies and other organisations.

Figure 2.2: Focus on high level skills in biodiversity research and management



Focus is important in a strategy, as it enables the implementers to concentrate efforts, make decisions about who to partner (e.g. universities rather than colleges), what to support and what to leave for others, and to measure progress more readily.

There is also a downside to a focus: some things need to be excluded, and this can be problematic, given the very connected nature of organisational endeavours. For example, an organisation may have very capable high skills leaders, but if they lack support from a capable work force, they will struggle to achieve their mandates. And, future leaders may be drawn from the ranks of those with only entry-level skills.

This connected nature of skills development and deployment must be borne in mind in the implementation of the BHCDS. While retaining the focus of the BHCDS targets, where possible, connections should be made with initiatives that address wider skills needs⁷.

2.3 SCOPE OF THE STRATEGY – PARTICIPATING STAKEHOLDER ORGANISATIONS

To some extent, most organisations can be said to have some bearing on biodiversity. Again, however, for the purposes of the strategy, a focus was necessary. Taking the lead of the NBF, a decision was made to specifically target primary biodiversity organisations, but not to exclude secondary stakeholders⁸.

Primary Stakeholders have a specific mandate or significant focus on biodiversity related conservation, management, research, or skills provisioning. These are the organisations with the biggest say in what the skills needs are, and with a major role to play in addressing them, therefore they need to be the primary participants in the BHCDS. They are:

⁷ Also see section 2.4 on the systemic and 'joined-up' principles promoted in this strategy.

⁸ For detail on the stakeholder organisations, informed by the sector analysis, see Chapter 3 (3.1).

- Conservation agencies – SANParks, provincial departments with a conservation role and parastatals (see Table 3.1)
- National government agencies with a specific biodiversity mandate – DEA with its Oceans & Coastal Management and Biodiversity & Conservation branches; SANBI
- Research institutes with a focus on biodiversity – SANBI, CSIR, SAEON, NRF
- Local government, where protected area management and mainstreaming of biodiversity concerns in development planning, as well as compliance, are relevant
- NPOs whose work include biodiversity related objectives (see Table 3.1)
- Higher education institutions – comprehensive and academic universities and universities of technology
- Ministry of Higher Education and Training and Sector Education and Training Authorities.

Secondary Stakeholders also employ people with biodiversity-related roles, but biodiversity is not their central mandate or business; alternatively, they play a secondary (though still important) role in providing skills for the sector. This group includes (not exclusively):

- Department of Agriculture
- Agricultural Research Council
- Department of Water Affairs
- Water Research Commission
- Private sector employing biodiversity managers, researchers, conservators
- Mining industry and Department of Mineral Resources
- Ministry of Defence
- Ministry of Basic Education.

Tertiary Stakeholders are groups and individuals who will not necessarily participate in the BHCDS, but who need to be aware of it, mostly because they may have some bearing on its effectiveness, however peripheral. This includes a range of government departments (such as Treasury and the National Planning Commission) and the general public.

All three of these stakeholders groups are targets for the communication plan that must support the implementation of the BHCDS. These groups will need different ‘messages’, and different responses will be required from them.

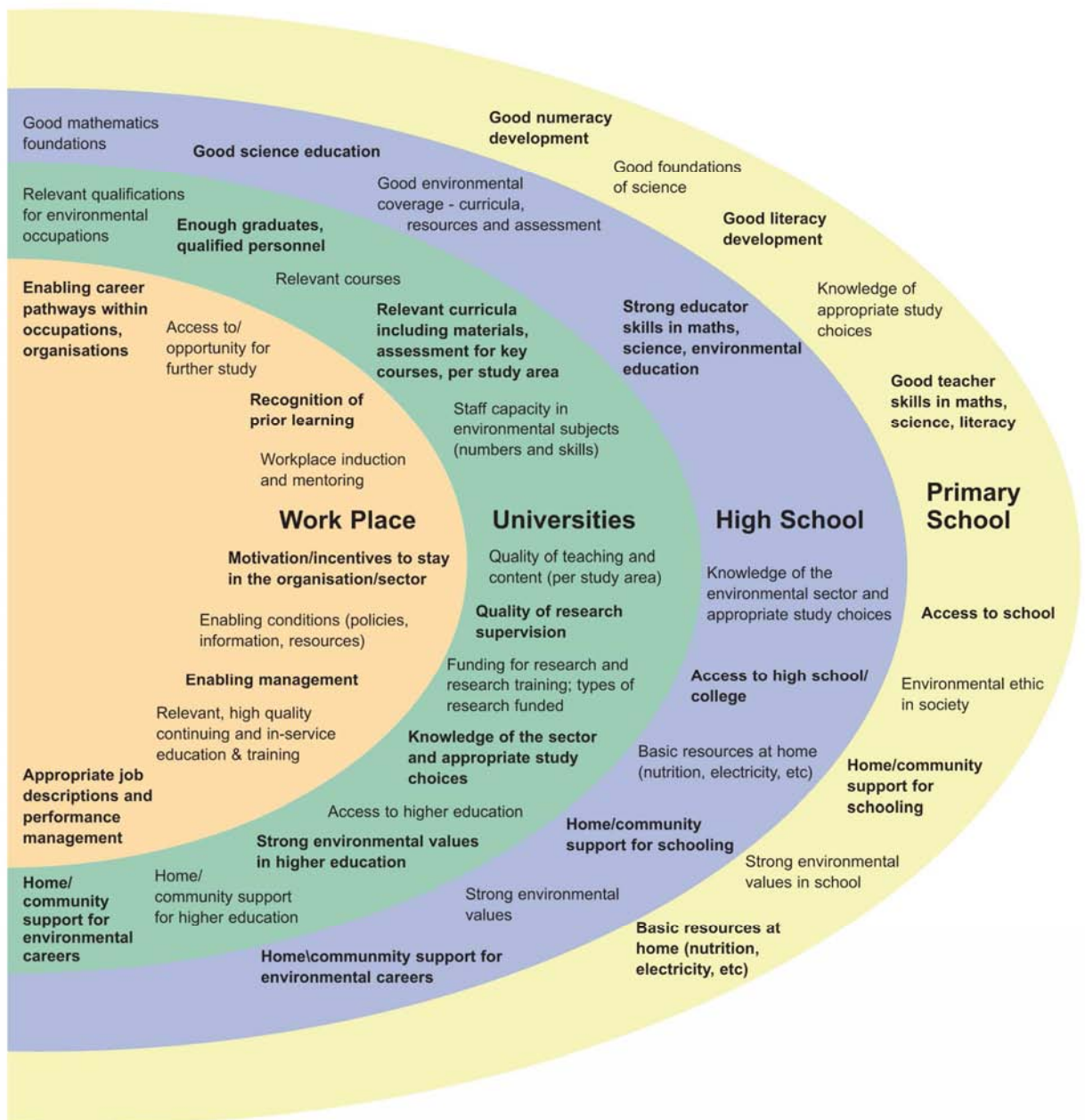
2.4 SCOPE OF THE STRATEGY – THE HCD PIPELINE

Whether people take up a leadership role in a biodiversity profession, with the necessary skills, depends on a range of influences. These are not necessarily reflected in the term ‘pipeline’, as they go beyond a demarcated educational path through school and higher education into a job. For example, the values and attitudes in the communities where a child grows up to make career and study choices, often influence those choices, as does access to information.

The pipeline concept also does not emphasise the role of conditions in the workplace in determining whether the arriving biodiversity professional stays or works effectively. Organisational culture, attitudes towards transformation, the presence or absence of inspiring mentors, and HRD practices are among the many factors influencing retention and the effective deployment of skills.

The BCHDS encourages us to keep in mind the entire web of interacting factors (see Figure 2.3) which shape South Africans' pathways through school, higher education, the workplace, and lifelong learning. While not all these factors can be addressed in a focussed strategy, it is wise to bear them in mind. Neglecting any one of these factors (including the more intangible ones) could result in the reduced efficacy or failure of highly targeted interventions.

Figure 2.3: Web of Interacting Factors in Biodiversity Skills Development



2.5 PRINCIPLES INFORMING THE BHCDS

The following ten principles inform the strategy and should be kept in mind as implementation activities are formulated, executed and evaluated. They should also be evident in the communications and funding development plans which support the BHCDS.

1. Realistic
2. Focused
3. 'Joined up'
4. Promoting articulation
5. Innovative
6. Building on existing strengths
7. Transformative in execution
8. Seeking multiple transformations
9. Systemic
10. Promoting shared ownership

Principle 1: Realistic

The Biodiversity HCD Strategy needs to make a material difference in the sector. It cannot simply be a paper strategy. An important consideration is the availability of funding. The Lewis Foundation has committed funds for aspects of implementation, and for the appointment of staff who are tasked with raising further funding. The strategy is accompanied by an implementation plan with realistic targets, as well as a monitoring and evaluation plan, to ensure that implementation can be monitored. A lack of progress must be addressed within the sector.

Principle 2: Focused

It is in order to be realistic, that the strategy is directed *only* at the apex of the pyramid that represents the staff of biodiversity organisations (see Figure 2.2): the top and middle managers, the researchers and the technicians with high skills. This is where the critically scarce skills are, and the greatest need for transformation.

Workers at other levels are also important: their work is interlinked with management and research; they keep biodiversity organisations functioning; and across all levels, green jobs have an important role in the national development agenda. Other strategies thus need to address skills development at these levels (see Section 1.1.4).

The strategy is also focused in that it is not trying to do everything for everybody, or to be all inclusive simply for the sake of being all inclusive. While avoiding an exclusivist approach, it is important to be clear who the primary participating organisations for the strategy ideally are (see Sections 2.3 and 3.2) to ensure that they do in fact participate.

Principle 3: 'Joined Up'

'Joined up' is a buzz word in strategy development, for good reason. The scope of human capital development for high skills is tremendous. Not only is the 'pipeline' from primary school to professor or chief executive officer long, it is also permeable and influenced by many socio-economic, cultural and historical factors (see Figure 2.3). So too is the workplace, for the 'pipeline' actually has no end. This has been discussed in Section 2.4. The BHCDS therefore cannot address aspects (such as scholarships) in isolation from other

factors (such as demand in the workplace, the family responsibilities of students or the quality of schooling). Its investments must, where feasible, 'join up'.

Principle 4: Promoting Articulation

The BHCDS aims to articulate with the country's overall development agenda, the national research and development agenda, national human resource development priorities and the national planning and skills development landscape. The Strategy also articulates with key policies in the biodiversity sector itself, such as the NBSAP (2005), and the Environmental Sector Skills Plan (DEA, 2010).

The BHCDS should also be promoted as a means of guiding organisations with their internal HCD strategies and skills plans, which should be aligned, where possible, for maximum impact.

Principle 5: Innovative

To our knowledge there is no similar HCD strategy for organisations involved in biodiversity research, conservation and management, elsewhere. As such the HCDS itself is a pioneering initiative. But it also needs to be innovative in its implementation plans. It has been developed and will be implemented in an environment where many needs compete for resources, and it seeks to address a complex problem of some duration. To succeed, it cannot simply promote 'more of the same'.

Principle 6: Building on Strengths

While *innovation* is a principle, the strategy must also not ignore existing HCD initiatives. Much could be learnt from them about what works or does not work well, when and why. Often, existing initiatives can be successful or more successful if they are taken to scale, or linked with others, or re-oriented around their particular strengths, within a more strategic framework. Opportunities to do this should constantly be sought during implementation and further development. This may necessitate evaluations of existing initiatives, as little information on lessons learnt is currently publicly available.

Principle 7: Transformative in Execution

The goal of the BHCDS involves transformation in the biodiversity sector. As such it also needs to bear transformation in mind in its execution. This means that when stakeholders, advisors or project staff are selected for contributions to strategy implementation and further development, equity and the opportunity to build skills should be strongly considered.

Principle 8: Seeking Multiple Transformations

Transformation is a key focus of the strategy. The Biodiversity HCDS embraces a three-fold approach to transformation, which encompasses:

- The need to improve racial equity in the sector
- The global and national changes in the approaches to and models for biodiversity conservation, management and research
- The need to transform the way in which organisations function, in order to render them more effective in achieving their mandates.

Chapter 3 expands on this principle.

Principle 9: Systemic

This has echoes in several earlier principles, and is discussed in detail in Section 2.1. Human capital development cannot simply focus on the individual at study, or on the aggregate of skills which the nation can build individual by individual. It needs to give equal attention to the capacity of the institutions which provide the training, and to the capacity of the workplace (biodiversity organisations) where these skills are to be deployed, retained and optimally utilised. A systemic approach to capacity development would aim to strengthen individuals, training providers and employing institutions (see Figure 2.1).

Principle 10: Promoting Shared Ownership

While SANBI has been mandated to lead the strategy development process and coordinate implementation, the BHCDS must belong to agencies across the biodiversity sector. Sector-wide ownership will be facilitated by:

- Stakeholder-based development of an ongoing nature
- Pro-active communications and the appropriate promotion of the strategy, and
- Shared means of implementation (see Chapter 7: Implementation Architecture).

CHAPTER 3: SECTOR ANALYSIS

3.1 PROBLEM STATEMENT

The problem to which this strategy responds has been articulated in many forums, and summarised in the National Biodiversity Framework (NBF, 2007). There is a lack of research, leadership and management skills in the biodiversity sector, particularly when the need for social equity is taken into account. The shortage of skilled conservation managers and professionals is holding back the development of the sector and the achievement of biodiversity conservation goals. While we have in place a set of progressive policies to reduce the loss of biodiversity and ecosystem services, the organisations tasked with implementing these policies are losing, or failing to develop, the capacity to do so.

The reasons for the lack of organisational capacity were seen as varied: the biodiversity mandate is significantly under-funded, and generally competes unsuccessfully with other national and organisational mandates; there is also not yet *sufficient* political support for and public understanding of the role that biodiversity plays in the well-being of South Africa's economy and its people. There is still an extensive need for advocacy and educational work. Yet we lack the human capacity to do this work, and to effectively implement biodiversity related policies.

The sector's limited human resource capacity is also thought to be caused by multiple factors. Graduates are said to come into the sector lacking the necessary high level skills to do the increasingly complex, conceptually demanding, cross-disciplinary and advocacy work that is required. For some skills, there are simply not enough graduates to fill positions, a situation exacerbated by the fact biodiversity does not seem to be a sector of choice for school leavers and graduates. Even those who study in a biodiversity field may choose employment in another sector. This seemed particularly to be the case among black South African graduates, who, it was thought, are unfamiliar with the biodiversity sector, may not identify with its values, or are turned away by non-competitive salaries. These were seen as among the reasons why the sector cannot achieve racial equity in senior posts. This two-fold and partly interconnected problem – to improve the availability of suitable high level research and management skills in the sector, and to employ more black South Africans in leadership positions – underpins the strategy.

The studies informing the BHCDS, summarised here, are providing a better understanding of the sector, within the confines of data limitations noted in Sections 1.3.1 and 3.3.1. They confirm the initial understanding of the problem, but also provide more detail, depth and nuance. For example, it has become evident that for many talented black South Africans, 'environment' is indeed a first study and employment choice, but organisations are not always able to retain and effectively utilise this talent.

This chapter provides a summary of research findings in three parts: an overview of the sector; demand side trends and issues; and supply side trends and issues. For the detail please refer to the relevant research reports.

3.2 OVERVIEW OF THE SECTOR

3.2.1 Scope of the Biodiversity Sector

The biodiversity sector is a sub-sector of the environmental sector. Distinguishing it from related sub-sectors – such as water, or natural resource management – is not easy. The delineation has been made on strategic rather than conceptual grounds, with a view to feasible implementation and the ability to track and assess progress, and ‘make a tangible difference’. The biodiversity sector permeates into fisheries, forestry, mining and agriculture (among others) and overlaps significantly with related sectors such as natural resource management. However, if the BHCDS were to aim to be all-inclusive, it would be difficult to focus human capital development funding and implementation activities in a concerted manner with sufficient depth, and to effectively monitor and evaluate and refine these activities. A broad-based HCDS would also have to engage with a large number of partner organisations, with diverse and often complicated systems and structures.

For these reasons, the sector analysis has *excluded*, for example, an analysis of the water sector (even though a large part of inland biodiversity occurs in freshwater ecosystems). Note has been taken of the skills needs required for managing aquatic biodiversity, but for more detail, and to make synergistic connections, the various capacity needs analyses that have already been conducted for South Africa’s institutionally complex water sector must be reviewed. Where possible, alignment has been sought with related skills development initiatives (see Chapter 2).

The need to focus and delineate has also informed a decision to focus on *primary* biodiversity organisations, as opposed to secondary organisations⁹. To explain the categorisation of these groups, a simple outline of the work done in the biodiversity sector is provided. For the purposes of HCD this work can be defined in terms of six overlapping areas:

- i. **Conservation** of biodiversity in proclaimed protected areas
- ii. **Mainstreaming** biodiversity considerations into industry, planning and development
- iii. **Enforcement** of compliance with biodiversity legislation associated with (i) and (ii)
- iv. **Education**, training and skills development
- v. **Advocacy**, lobbying, awareness raising and funding
- vi. **Research** and monitoring to better understand biodiversity, and guide all the above.

Figure 3.1 shows these functional areas in the sector in relation to each other. The roles in the central block (all except research and education) are referred to elsewhere in this document as ‘biodiversity management’.

⁹ An initial outline of these, plus tertiary stakeholders, was provided in Chapter 2.

Figure 3.1: The scope of work in the biodiversity sector

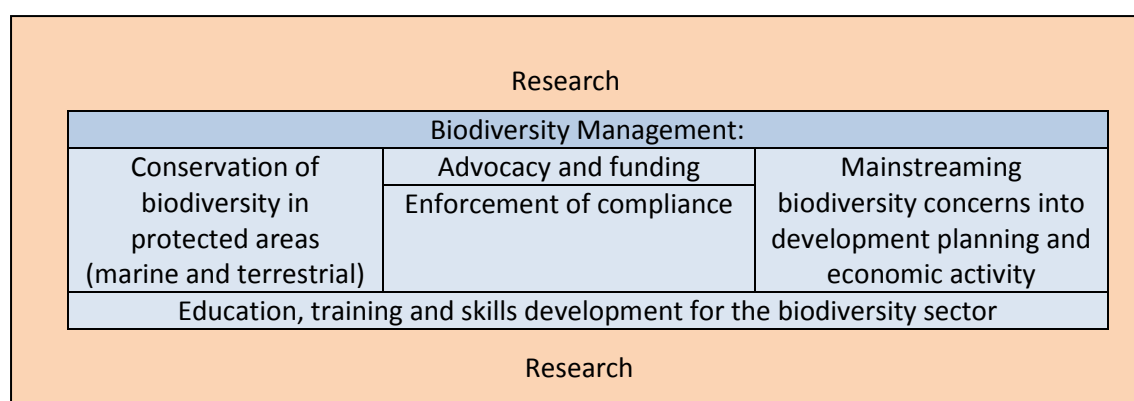


Table 3.1 shows a selection of organisations that play these various roles. Most organisations play more than one role, but tend to favour one role above others (e.g. SANParks is primarily responsible for conservation in protected areas although it also conducts research; SANBI is primarily responsible for research but also pilots mainstreaming activities; NPOs feature strongly in education and advocacy work but also play a role in research). The list is not exhaustive and not all relevant organisations are listed.

Table 3.1: Organisations included in the sector analysis and BHCDs planning

| Areas of work or roles in the biodiversity sector | Organisations typically involved |
|---|--|
| (i) Conservation in protected areas | SANParks; Marine and Coastal Management (now Oceans and Coastal Management); CapeNature; Eastern Cape Parks (recently amalgamated with Tourism Agency); Ezemvelo KwaZulu Natal Wildlife; iSimangaliso Wetland Park Authority; Mpumalanga Tourism and Parks Agency; North West Parks and Tourism Board; Limpopo Tourism and Parks Board; Limpopo Department of Economic Development, Environment and Tourism; Free State Department of Tourism, Economic and Environment Affairs; Gauteng Department of Agriculture, Conservation and Environment; Northern Cape Department of Tourism, Environment and Conservation; local authorities across the country (although their mandate is not always clearly defined in legal terms); Department of Water Affairs |
| (ii) Mainstreaming biodiversity into industry, planning and development; includes rehabilitation and restoration | Department of Environmental Affairs and nine provincial environment departments; 31 national departments with legislated environmental management functions and responsibilities; industries including agriculture, forestry, mining, fisheries; DWA and the water and energy sector; local government; WESSA, CapeNature and SANBI (advisory role and rehabilitation through Working for Wetlands); consulting firms |
| (iii) Enforcement of compliance | Departments of Environmental Affairs, Water Affairs, Agriculture; nine provincial environment departments; conservation agencies as listed for (i); local authorities; legal system and police |
| (iv) Education , training, skills development | Universities; Department of Environmental Affairs (DEA) and nine provincial environment departments; NPOs including EWT, WESSA, WWF, Birdlife South Africa, Botanical Society, |

| | |
|--|--|
| | SANCCOB and others; most other agencies to a greater or lesser extent; private consulting firms |
| (v) Advocacy , lobbying, awareness-raising, funding | NPOs as listed for (iv); international donors like the Global Environmental Fund and private foundations like the Lewis Foundation; DEA; SANBI; universities |
| (vi) Research and monitoring | Universities, SANBI, CSIR, SAEON, South African Weather Service, DST and NRF (as funders), DEA, WWF and other NPOs; private consulting firms |

For the purpose of developing human capital to address the need for skills and transformation in relation to biodiversity research and management, the strategic decision has been to focus mainly on primary organisations, without excluding skills development to serve important biodiversity functions in secondary organisations.

Primary organisations are those with primary biodiversity mandates and roles, including DEA with its Biodiversity and Conservation branch, Oceans and Coastal Management branch, and the nine provincial environment departments; organisations such as SANParks, independent agencies and local authorities responsible for protected areas; agencies such as DEA and SANBI that guide and direct mainstreaming; SAEON, SANBI, CSIR and others that conduct biodiversity monitoring and research; all universities, which produce biodiversity research and graduates; and the NPOs which play a number of roles in the sector¹⁰.

Secondary organisations are those that have a responsibility regarding biodiversity mainstreaming, conservation or education, and thus employ biodiversity professionals, but biodiversity is not their primary mandate. Examples would be the mining industry (which must mitigate against biodiversity loss and rehabilitate degraded ecosystems); the agricultural industry (which must conserve biodiversity as a natural resource within their primary mandate, sustainable production); the Department of Basic Education (which has a responsibility for environmental education among others); Eskom and the Department of Defence (conduct conservation on land under their jurisdiction, but this is not their primary role); the pharmaceutical industry and the legal system that prosecute offenders in biodiversity related crimes (among others). Also included among secondary organisations are the private consulting firms which employ biodiversity professionals, and provide biodiversity research and mainstreaming services to others.

These secondary organisations are of enormous importance in safeguarding the future of South Africa's biodiversity, and all require an adequate supply of high level biodiversity skills. The premise here is that *these organisations are being fed, informed, guided and enabled by the primary biodiversity organisations*, and that the BHCDS must therefore first and foremost address the skills needs for these primary organisations. As an outflow of this focus, there will also be an increase in the availability and quality of skills – as well as enabling biodiversity leadership – for the secondary organisations.

The methodological implication of this decision was that more attention was given to probe the organisational needs of the primary biodiversity organisations; secondary organisations were not ignored, but there was less emphasis on their needs during stakeholder engagements. It is however important to note that the proposed implementation plan does not exclude projects addressing particularly important issues in the secondary organisations.

¹⁰ This list is in keeping with, but somewhat broader, than the key agencies identified for biodiversity HCD in the NBF, 2007.

For example, agricultural extension and mainstreaming of biodiversity understanding into urban planning and agriculture are two key projects in the implementation plan.

Two observations regarding the scope of the sector need to be noted here, for their implications for human capital development.

Firstly, there are a range of organisations with overlapping responsibilities. For example, SANBI and SAEON both have responsibilities for monitoring. As many as four agencies may share responsibilities for protected area management in a single district. There have been calls for some time for the centralisation of limited resources including scarce skills in biodiversity research and management. Even if rationalisation plans go ahead, the need for skills to research and manage the existing protected area estate, will remain.

Secondly, in addition to the range of organisations in the sector, there are also numerous formal and informal alliances and associations. Examples are multiple groups focusing on climate change; resilience; adaptive management; single charismatic species such as elephants; or biomes such as fynbos. The biodiversity professional's annual calendar features many meetings of these groups. Yet there is also considerable fragmentation of professional activities, and biodiversity organisations seldom come together *as a sector* to address matters of sectoral interest. This has started to change with the formation of the national biodiversity institute (SANBI), which has been given a coordinating role by the DEA. Policy frameworks to enhance coordination are increasingly developed by DEA, SANBI and partners. The BHCDS is an example of DEA mandating SANBI with a coordination role. It is the first sector-wide implementation initiative with a human capacity development focus.

3.2.2 Policy Frameworks and Other HCD Drivers in the Biodiversity Sector

The Ecological Driver

The term biodiversity is generally used to refer to the variety of species of plants and animals; the genetic diversity within species; and the diversity of ecosystems within which species occur and interact. Increasingly, biodiversity is being considered within a framework of ecosystems and the ecosystem services to which the diversity of species contribute.

In 2004 a National Spatial Biodiversity Assessment (Driver et al., 2005) provided a first comprehensive scientific appraisal of the state of South Africa's ecosystems. It found that 34% of 440 terrestrial ecosystems were threatened. Freshwater ecosystems were particularly poorly conserved, with an estimated 50% of wetlands degraded or destroyed, and 82% of river signatures threatened, and 44% critically endangered. The country's 259 estuaries were divided into 13 types, and 3 of these 13 estuary types were classified as critically endangered. Among marine bio-zones, 65% were shown to be threatened.

This picture resonates with the international assessment of ecosystems presented in the Millennium Ecosystem Assessment (MEA, 2005) which found that the world's terrestrial, aquatic and marine ecosystems were being degraded at a pace faster than the pace at which societies are adapting lifestyles and development pathways to reduce biodiversity loss and ecosystem degradation. The MEA demonstrated that biodiversity and ecosystems provide services to humankind and that their protection is a sensible pathway to sustainable livelihoods and socially just development, rather than an obstacle in the path of development. Humans and their economies depend directly on specific species of, say, thatch grass or fish, but are also more indirectly dependent on ecosystem services such as

pollination of agricultural crops by wild insects, or water purification in wetlands. These services are not easy to quantify, but the loss of natural resources is increasingly recognised as a factor in human vulnerability, poverty and conflict. There is also a growing realization that biodiversity loss is part of a socio-ecological or 'poli' crisis involving social inequalities, the degradation or demise of natural resources, climate change, the collapse of economies on local and global scales, and failures in corporate and state governance (see Global Change Grand Challenge, www.dst.gov.za).

The most prominent threats to South Africa's biodiversity are:

- **Habitat loss** due to the expansion of agriculture and human settlements. The ability to maintain and improve food production while reducing the impact on ecosystems is a significant research and management challenge for the country.
- **Invading alien species** which outcompete, or create conditions unsuitable for, local plants and animals. In the Western Cape Province, for example, invasive trees are a grave threat to water security and indigenous vegetation.
- **Pollution** from untreated sewage, farming, mining and other industrial activities affect freshwater, marine and terrestrial ecosystems; and air pollution contributes to the acidification of ecosystems. The MEA describes the eutrophication of freshwater systems due to fertilizer run-off as a global crisis of similar proportions to global warming.
- **Climate change**, linked to the waste products of the fossil fuel economy, large scale agriculture and other industries, is now widely recognised as a threat to biodiversity, particularly endemic species at risk from reduced rainfall and temperature changes.
- **Over-use** of specific species, particularly in marine and coastal ecosystems, by commercial and subsistence users, involved in both legal and illegal harvesting.
- **Over-abstraction of water**, particularly for agricultural purposes, which threaten diversity in freshwater systems like rivers, wetlands and estuaries, among others.

The ecological driver underpins the need to fast track and scale up the development of skills for biodiversity management and research. The contours of the social-ecological crisis indicate the need for skilled personnel to work in and with those industries and communities whose activities pose the greatest threats, and the need for skills to effectively plan for and manage biodiversity in a context of sustainable development.

There is an under-appreciated need for social research skills, to better understand the ethical, cultural, economic, social learning and governance systems required to reduce the human footprint and improve ecologically sustainable livelihoods.

There is clearly a need for ecological research skills. Most ecosystems are significantly under-researched, and without a sound understanding of ecosystems and the factors affecting them, it is difficult to predict changes, to advise on management practices and sustainable harvesting rates, and to make decisions about development. Thus the precautionary principle applies and development applications are slowed down. Even with research insight,

an adaptive management approach is required, given the dynamic nature of systems. Adaptive management is a new skill in the biodiversity sector, and gives rise to additional skills needs, including widespread research, evaluation and monitoring skills, and the ability to work effectively in the face of uncertainty.

National and International Policy Frameworks

An overview of policies, legislation and international frameworks guiding the biodiversity sector suggests the following implications for human capital development:

- There is increasing recognition of the importance of natural resources in South African society and economy at the highest level of government, and this opens up new opportunities for environmental skills development. The *Medium Term Strategic Framework* (MTSF) 2009-2014, lists ten strategic priorities for South Africa. These include rural development, sustainable human settlements, human resource development and the sustainable use and management of natural resources, under which the enhancement of biodiversity and the conservation of protected habitats is listed (p.38). The MTSF is issued by the Minister in the Presidency (Planning) and guides and coordinates planning and resource allocation across national, provincial and local government. The Ministry of Higher Education and Training will also use it to direct the National Skills Development Strategy (NSDS III) and the programmes to be developed by Sector Education and Training Authorities (SETAs).
- South Africa's environmental policies place *people* at the centre of environmental concerns. The overarching guide is the *National Environmental Management Act* (NEMA), Act 102 of 1998. Taking its cue from the South African Constitution it situates environmental concerns in a people-centred approach to sustainable development. This approach is also evident in the suite of policies linked to the NEMA, including the *National Water Act* (Act 36 of 1998) with its twin focus on equitable sharing of resources and sustainability (some for all, forever), and the *National Biodiversity Act* (NBA, Act 10 of 2004). The *National Biodiversity Strategy and Action Plan* (NBSAP, 2005), an outflow of the NBA and the international *Convention on Biological Diversity*, prescribes an integrated planning framework that integrates and aligns biodiversity and development planning (including poverty alleviation and local economic development), and the integration of biodiversity priorities in spatial planning at national, provincial and local levels. The *National Framework for Sustainable Development* (2007) emphasises the need for South Africans to use natural resources more efficiently and sustainably, and to embed socio-economic systems appropriately within a recognition of their relationship with ecosystems. The *Protected Areas Act* situates park management within a context of stakeholder engagement and shared benefits. The implications of the slant of our legislation are clear: There is little room for research and management styles which isolate biodiversity from the needs of society; biodiversity professionals need the ability to work across sectors, organisations and disciplines; and skills are required from the social (including economic sciences) and the natural sciences.
- New legislation creates new skills demands. Examples are the introduction of the *Marine Living Resources Act* (Act 18 of 1998), which provided for the establishment of marine

protected areas, and necessitated the development of marine protected area management skills. The *Integrated Coastal Management Act* (Act 24 of 2008) has significant implications for increased skills demands to deal with development applications in the marine and coastal environment, and for estuarine management skills.

- South Africa has a comprehensive suite of environmental laws and policies. However, the mandates associated with these guiding documents are under-funded, resulting in a shortfall of budgets and staff (see Demand Side Analysis). As a result, many policies refer to the need for capacity development (see Skills Drivers, below).
- South Africa is also signatory to international conventions such as the *Convention on Biological Diversity* which commits us to custodianship of a global treasure of plant and animal species. International conferences, conventions and commitments to care for the biodiversity 'hotspots' have already brought significant funding to the country, some of which has been used for capacity and skills development. This is likely to continue. Recently the United Nations Intergovernmental Platform for Biodiversity and Ecosystem Services (IPBES) agreed to a new macro-programme on this theme. The IPBES negotiated around two key elements: the generation of ongoing assessments of global knowledge on ecosystem services and dynamics as the basis for good planet management through sound policy advice, and a major capacity building programme, with an emphasis on capacity needs in the global South.

Economic Drivers

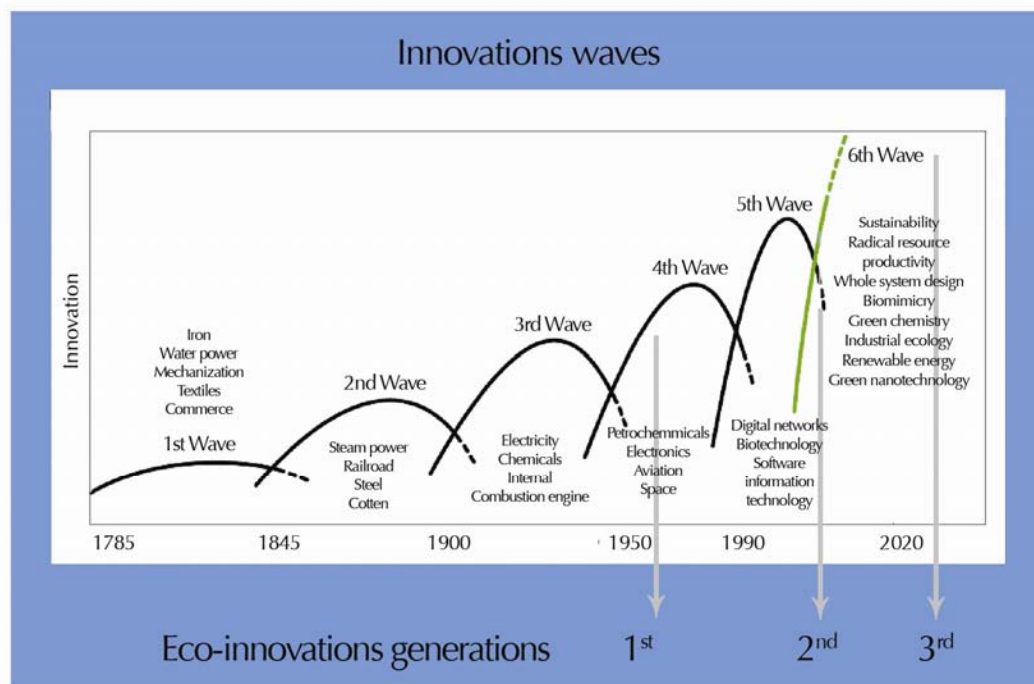
Traditionally, ecological drivers and economic drivers were pitted against each other. While this is often still the case, there are also areas where these drivers no longer work in opposite directions. In the outline of the ecological driver there was mention of the new direction in the conservation sector, to integrate biodiversity considerations in development and urban planning, agriculture and other economic activities. From an economic perspective, there is evidence of a new recognition of the role of biodiversity considerations in economic planning. Economic drivers also hold threats for both biodiversity conservation and skills development. The implications for HCD include the need for skills across economic and biodiversity knowledge fields, and skills in advocating for greater recognition of the role of biodiversity in economic development and well-being.

- The recent global slowdown in economic growth following the collapse of the world financial sector has been mooted as a potentially negative factor for HCD, given the effect it may have on grant funding available (see Vass et al., 2009). The HSRC study suggests that the recession may limit growth in the biodiversity sector, and thus recommends that organisations invest in up-skilling existing staff, as new posts may be few and far between.
- The other side of the recession coin is the search for new avenues for economic growth. In keeping with global trends, the South African Departments of Environment, Trade and Industry, Economic Development, and Science and Technology, convened a Green Economy Summit in May 2010, where they committed to a 'green growth' path that is resource efficient, pro-employment, and based on carbon reduction. Speakers

emphasised the need for new skills to make the most of the emerging development opportunities. The risk is that a green economy will be associated exclusively with the energy and waste management sectors; there is a need to position biodiversity jobs in this framework, too.

- Recent industrial policies have taken green growth options into account. The National Industrial Policy Framework (NIPF) and the Industrial Policy Action Plan (IPAP) developed in 2007, before the MTSF, emphasised the intensification of industrial development and made no reference to sustainability or biodiversity considerations. IPAP2, however, includes reference to the emergence of a green economy.
- Currently the South African Goods and Services market is fragmented and comprises between 1% and 1.7% of the Gross Domestic Product (R20 billion per annum). It is also one of the areas that is projected to grow rapidly in the next five years (to three times its current size). This projected growth of the Environmental Goods and Services Sector clearly requires accelerated environmental skills development.

Figure 3.2: Trends in development according to Montavaldo (ESSP, DEA, 2010)



- Both the *National Research and Development Strategy* (DST, 2002) and the *Ten-Year National Innovation Plan* (DST, 2007) emphasise the importance of the biodiversity heritage as a foundation for improved scientific and commercial research, development and innovation. The latter outlines five grand challenges, all of which have implications for the biodiversity sector. While some industrial approaches may only focus on exploiting biodiversity for commercial gain, giving little attention to sustainability, others note that the next global wave of innovation will be an era of eco-innovation (see

Figure 3.2), in which the winning technologies will be those that reduce humankind's impact on the planet.

- Government's renewed focus on the National Rural Development Strategy is also significant, given the importance of intact ecosystem services and sustainable rates of utilising natural resources like wetlands, grazing and trees; and the role that protected areas can play in rural development. Protected areas can act as hubs with human resources, skills and ingenuity to share in impoverished rural contexts, along with other more tangible benefits.
- In 2008 and 2009 conservation partners in the Cape Floristic Region conservation agencies successfully lobbied Treasury to introduce green fiscal tax incentives, to encourage landowners to set aside part of their property for conservation purposes. The MTSF (2009, p.39) notes the need to continue to explore green tax and fiscal incentives to foster biodiversity conservation.

The Drive for Transformation

The National Biodiversity Framework (NBF, 2007, p.24) notes that "the biodiversity sector is far from representative of the South African population, reflecting the ongoing legacy of past discrimination and inequalities". The drive for social equity, particularly in leadership positions in the sector, is a significant motivation for this strategy. The research informing the strategy found the following factors contributing to the problem:

- The inadequate quality of education in schools attended by the majority of black South Africans; inequality in educational provisioning is perpetuated in that the results of post-apartheid schooling continue to show a bi-modal curve; it may also continue at further and higher education levels (see Supply Side Analysis, below).
- A general lack of familiarity with the biodiversity sector and its career opportunities and study requirements, and limited access to information among black South African school leavers in particular.
- A perception that the sector pays poorly.
- An experience that organisations in the sector are not welcoming to black South Africans.

While social equality is therefore an important focus of the BHCDS, the strategy is informed by multiple aspects of transformation. There is, for example, a need to consider a transformation in the way in which organisations in the sector function, in order to render them more effective in achieving their mandates, inter alia by creating conditions, including human resource development, management frameworks, diversity management strategies and the provision of suitable tools and resources, that are more conducive for staff of all race groups, to do their work.

Another dimension of transformation is the introduction and development of new approaches to conservation and conservation science in South Africa. As noted in the overview of policy frameworks, conservation is no longer approached as separate from

development. This is evident in a people-centred approach to conservation and the concept of mainstreaming biodiversity in development planning and economic activity. Scientific approaches to conservation have also progressed from a focus on single species, or ecosystems in 'balance', to a more integrated approach that situates species within dynamically variable ecosystems, and ecosystems within bio-regions and 'living, working landscapes'.

There is an emergence of new knowledge fields that are relevant to the sector. These include a growth in climate change sciences, and the application of concepts like social learning, to the traditional sciences. The social and natural sciences are also increasingly drawing on systems theory (seeing ecosystems as opposed to species, complexity theory (seeing ecosystems as complex rather than simple or complicated systems, and dynamically in flux, rather than striving for a steady state of balance), among others. Adaptive management has emerged as an evidence-based approach to managing ecosystems in contexts of great uncertainty across time and geographical scales.

New knowledge fields and new approaches to science and conservation have various skills implications:

- The sector needs research and management skills informed by both the natural and the social sciences, as noted above.
- The sector needs integrative skills, between natural science disciplines, between natural and social science disciplines, and between the social sciences, so that biodiversity professionals can work in multi-disciplinary teams, and work from within their specialist fields with a trans-disciplinary perspective.
- The sector needs what has been termed 'a new breed of scientist' to deal in innovative ways with challenges that are either new (e.g. urban conservation), or being understood in new ways (e.g. from a socio-ecological rather than simply a technical point of view).
- The need to up-skill or re-skill older biodiversity professionals, and older training providers, in the light of new approaches and new knowledge areas, without losing valuable 'traditional' skills.

Skills Drivers

The above drivers have clearly shown the need for more skills, more equitable skills distribution, and new skills. The Demand Side Analysis will also indicate the need for higher levels and greater quality of skills.

In relation to its Strategic Objective, SO2, *Enhanced institutional effectiveness and efficiency*, the National Biodiversity Framework (NBF, 2007) notes that the skills and equity issues in the sector comprise a complex problem that requires both the coordination of existing capacity building efforts and resources, and investment in additional resources for capacity building. The NBF suggests a national capacity building programme involving bursaries, internships, targeted skills development programmes, and learnerships, with employment equity targets for all key conservation and research agencies in the sector, that should be "firmly established and underway by 2012" (p.25). As lead agencies it lists SANBI, DEA, SANParks, provincial conservation agencies, HEIs and relevant SETAs.

3.3 OVERVIEW OF SKILLS PLANNING AND DEVELOPMENT IN THE SECTOR

In this final section on the context of the BHCDS, we briefly review the national skills planning and development system and related issues.

The first point to note is that biodiversity organisations have recognised the need for social equity and for skills development, and there have been a number of efforts in the past 15 years to address these. There have been significant successes, but in the absence of a national strategy and monitoring mechanism, it is hard to evaluate progress.

There have also been significant difficulties. Among them is the sector's ability to access funding for skills development. The need for biodiversity skills, or environmental skills more broadly, is not reflected in the Human Resource Development Strategy for South Africa, 2009-2003. The National Skills Development Strategy (NSDS II) made no provision for environmental skills planning, despite inputs in recent years from the sector. As a result there is no clear directive to Sector Education and Training Authorities (SETAs) to make provisions for environmental sector skills planning. The sectoral skills plans produced by SETAs (on which training allocations of the Skills Levy are based) by and large neglect environmental skills needs. There are several reasons for this situation, for example:

- The Skills Levy is paid by large employers, and not by the public sector. Perhaps as a result, the SETA system has served the needs of commercial industries (such as forestry or tourism) better than it has served state interests such as conservation.
- While SETAs were meant to integrate environmental concerns into their planning, this has not been the case. Even the Tourism and Hospitality SETA (THETA), with its Conservation chamber, failed to make a significant contribution to skills development in the biodiversity sector. Conservation agencies have been able to gain funding for tourism training from THETA, but report that they could not get adequate support for conservation training, despite numerous efforts to do so.
- The SETAs have operated in many instances without adequate understanding of the sectors they served; this has been the case across the board (Kraak, 2009) but perhaps particularly so in the case of cross-sectoral public interest sectors such as the environment and conservation.
- Biodiversity organisations have not been producing Workplace Skills Plans (WSPs) which clearly outlined the need for environmental skills needs. WSPs have been used to compile Sector Skills Plans. WSPs are generally weak, as organisations seem unable to identify their skills needs in ways which the Human Resource departments can take up in WSPs.
- The split in education and training provisions, characterised by the split between the Department of Education (under which universities resorted) and the Department of Labour (with which SETAs were aligned) also hampered effective skills development in the country. SETA funding was, for example, seldom used for higher education and training, and the biodiversity sector (like others) did not use learnerships for training above NQF Level 5, although in theory this was possible. Universities have by and large

chosen to continue operating outside the SETA system. The establishment of a Ministry of Higher Education and Training in 2009 was a positive step towards bringing education and training initiatives closer together.

In 2010 the new Ministry called for comment on a draft of NSDS III and the new SETA landscape. A National Environmental Skills Development Forum was formed under the auspices of the DEA and a joint submission was made. This submission argued for:

- Explicit integration of the environmental driver in the NSDS III and the Human Resource Development Strategy for South Africa, in keeping with the strategic priority of sustainable resource management and use, identified in the MTSF.
- More extensive and explicit provisions for environmental skills in the new SETA landscape
- A mechanism to review Sector Skills Plans to ensure the integration of the environmental driver.

It is important for the BHCD programme to continue involvement in this process, and to continue lobbying for adequate skills provisioning for biodiversity skills in the national skills system.

3.4 DEMAND SIDE ANALYSIS

This summary is based on research by the Human Sciences Research Council (Vass et al., 2009) and the research informing the Environmental Sector Skills Plan (DEA, 2010).

3.4.1 Size and Sites of the Sector

It is difficult to estimate the size of the biodiversity sector accurately. Its employees are largely 'hidden' in the official statistics. This is because of a number of issues associated with identifying and counting biodiversity personnel, including the following:

- The national system of skills monitoring uses Standard Industrial Codes (SICs) and Standard Occupational Codes (SOCs) to count and estimate how many people are employed in the different sectors, through counts in an annual Labour Force Survey that are then forwarded to Statistics South Africa. However, there is no SIC for employees in the biodiversity or even the broader environmental sector.
- There are also high levels of aggregation and overlaps in the SOC categories used for counting these employees. For example, occupations in libraries, museums, botanical gardens, zoos and nature reserves are all grouped in one category. These occupations may also fit in other categories used, like local government and provincial government (where many reserves are situated, for example). The lack of differentiation is also evident in the lack of distinction between different specialisms in the life sciences, for example, in the Labour Force Survey data.

- At a sectoral level there are many inconsistencies between organisational systems, for example, similar occupations are not named the same across organisations in the biodiversity sector. Thus it is not possible to accurately estimate the number of conservation technicians, for example, as these occupations are differently named in different organisations.
- At an organisational level, many organisations do not keep suitable human resource records. For example, most provincial departments which combine conservation related functions with other functions (such as environmental management or tourism), do not distinguish in their records between these functions, and thus it is impossible to count conservation personnel versus tourism personnel.

Using data from a variety of sources, the HSRC estimates the size of the sector as indicated in Figure 3.3.

Figure 3.3: Size of the Biodiversity Sector

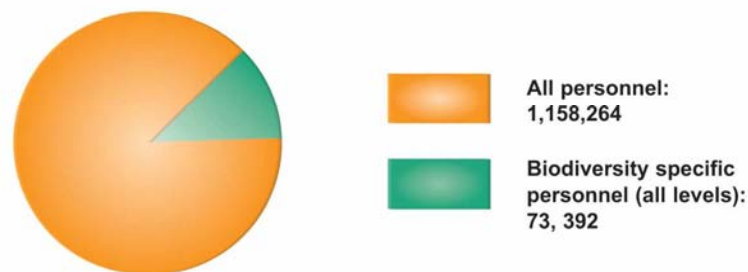


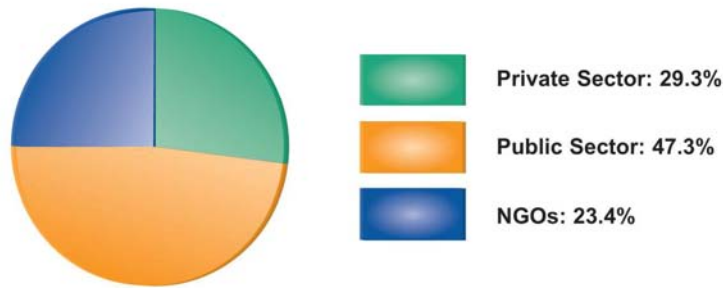
Figure 3.4 compares the number of **generic** managers, professionals and technicians in the sector **with biodiversity-specific** managers, professionals and technicians. Generic staff do not have a specific biodiversity-specific occupation, but may provide important support, for example database management, road engineers and human resource (HR) managers. The combination of competencies in both generic and biodiversity-specific tasks is a critical skills mix in the sector.

Figure 3.4: Mix of Professionals in the Biodiversity Sector



Where are biodiversity personnel employed? The HSRC estimates that more than half of biodiversity personnel work outside the public sector (Figure 3.5). This is an important observation, as there is a tendency to see the biodiversity sector as a state sector only, with associated assumptions about the availability of work, and employment conditions, in the sector. For example, the PACE career guidance programme warns school leavers that as most positions are in the public sector, there is little growth (new jobs) forecast for the conservation and wildlife management sector.

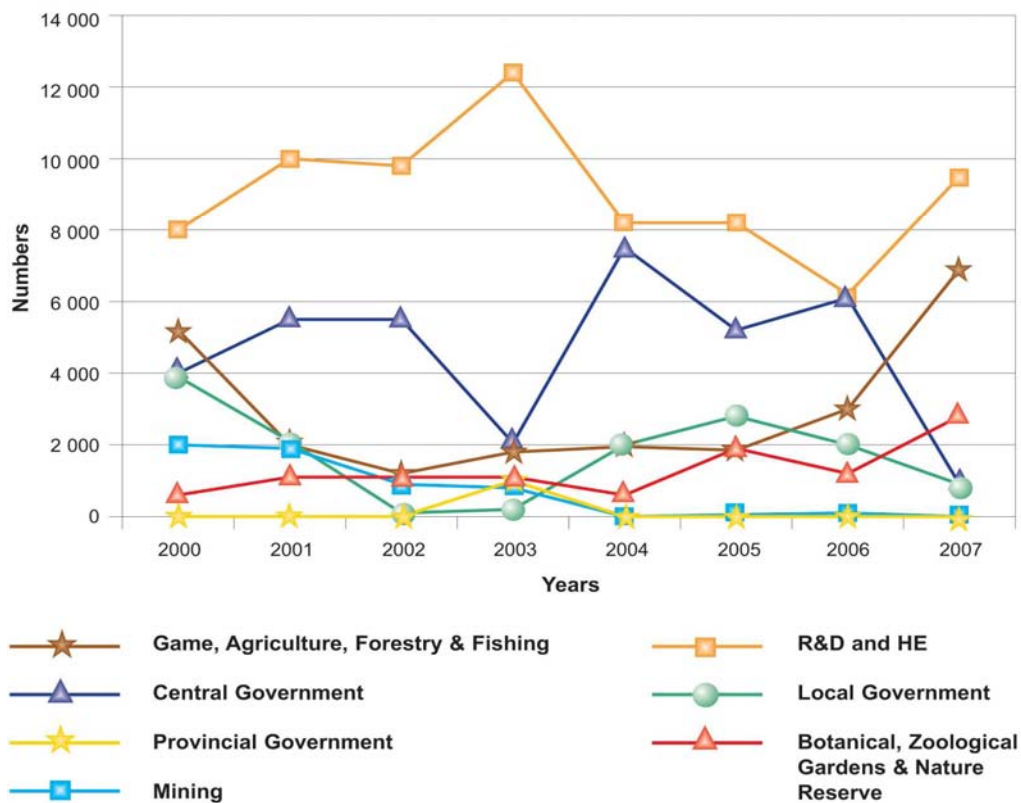
Figure 3.5: Sites of Employment in the Biodiversity Sector



3.4.2 Growth in Employment

Within the data limitations noted in 3.2.1, Labour Force Survey data shows that from 2000 to 2007 there has been a *decline* in growth in employment of nearly 2% per year on average in the environmental sector as a whole. However, Vulindlela data for the public sector indicates a *slow growth in employment in public biodiversity organisations* of on average 1,1% per year from 2003/4 to 2008/9. In the biodiversity sector in general there seems to have been *some growth and some decline* in the various sites of employment from 2000 – 2007 (see Figure 3.6). The decline has been in mining and in local and provincial government, which have seen a shedding of jobs; in national government there have been huge fluctuations. In Botanical and Zoological Gardens and Nature Reserves there has been considerable growth (more than 23%), and there has also been employment growth in Game, Agriculture, Farming and Fisheries (3,7%) and in Research and Development (2,3%).

Figure 3.6: Employment trends in core occupations in the biodiversity sector, 2000-2007



Predictions based on Figure 3.6 suggest that we will see faster growth in the employment of core technicians (associate professionals) in the public sector. Organisations interviewed intend growing biodiversity staff in general by 2% over the next five years. However, the HSRC warns that, given the average low levels of growth in employment the sector, and the possible impact of the economic recession on public and private expenditure, the sector cannot look forward to a significant growth in employment. This is one reason why they recommend that the sector should invest in 'growing its own timber'.

Currently there is *generally* a balance between supply and demand; the number of graduates coming through the system (which has been increasing and is anticipated to grow with a further 5.8% from 2000-2007) can meet the relatively low level of demand (estimated at 4.8%) *in general*.

Why then is there a need for human capital development? A simple supply-demand analysis is in fact not an adequate tool for skills planning in the sector, for a number of reasons:

- Current low levels of growth in employment are based on a lack of foresight in planning for the skills needs associated with growing and increasingly complex mandates related to biodiversity including new legislation such as that pertaining to protected areas and integrated coastal management, and the emerging risks associated with climate change and technologies like GMOs.
- Several national reviews have found that the biodiversity mandate is under-funded, and staff budgets tend to be inadequate compared to the size and complexity of the tasks required by new policies and legislation. There are not enough posts for the tasks required.
- In addition, there is an average vacancy rate of 22% in public biodiversity agencies, which goes up to 37% among nature conservation professionals, 41% in other nature and oceanographic occupations, and 51% in nature conservation technicians.
- Some skills are widely regarded in the sector as scarce (e.g. taxonomy and resource economics), but this is not reflected in vacancies as the required posts do not exist.
- Skills are not available (or appointed) at the required level, and there has been a decline in qualification levels in the sector (see Supply Side Analysis).
- Equity candidates are not available (in particular black graduates and post-graduates).
- When suitable graduates and post-graduates are available, the biodiversity sector does not always compete well for them with other employers (conditions of employment e.g. salary, location).
- When suitable skills are attracted to the sector, organisations may fail to retain them, through a lack of suitable career paths, salary packages, diversity management, talent management, or enabling working conditions.
- Among managers and professional staff there have been huge fluctuations, some of which can be attributed to 'churning' (moving from organisation to organisation within the biodiversity sector) due largely, it would seem, to employment conditions.

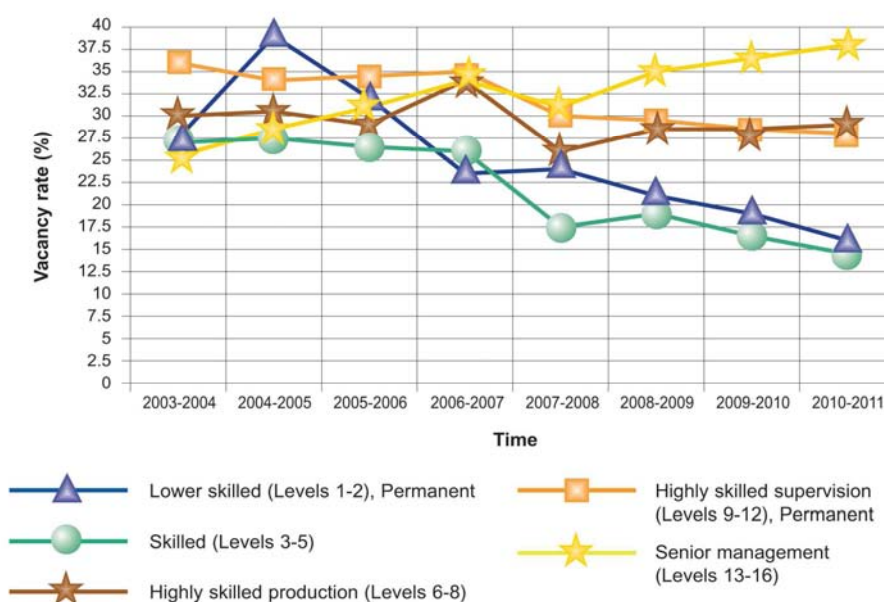
3.4.3 Vacancies and Instability in the Sector

Table 3.2 demonstrates the known high vacancy levels in biodiversity organisations in the public sector. Figure 3.7 illustrates the high levels of instability in senior management positions across the economic sector in which the public environmental sector resides. The situation reflects one which is not conducive for delivering on mandates, due to too few staff, too little stability (e.g. in institutional memory), and too much pressure on the staff who are in place.

Table 3.2 Vacancy rates in the public biodiversity sector (Vulindlela data), 2007/2008

| Occupations in the public sector | Number of Posts | Number of Posts Filled | Vacancy Rate |
|--|-----------------|------------------------|--------------|
| Nature conservation & oceanographical related technicians | 910 | 441 | 51.5 |
| Life sciences related professionals | 4 | 2 | 50.0 |
| Geologists, geophysicists hydrologists & related professionals | 348 | 193 | 44.5 |
| Natural science professionals | 853 | 538 | 36.9 |
| Computer occupations | 272 | 178 | 34.6 |
| Generic professionals | 5036 | 3385 | 32.8 |
| Veterinarians | 300 | 205 | 31.7 |
| Agricultural, oceanography, forestry & other scientists | 1415 | 974 | 31.2 |
| Environmental health professionals | 45 | 32 | 28.9 |
| Agricultural related support | 1915 | 1376 | 28.1 |
| Generic managers | 1442 | 1046 | 27.5 |
| Biochemistry, zoology & life science technicians | 1517 | 1110 | 26.8 |
| Veterinary assistants | 79 | 59 | 25.3 |
| Biologists, botanists, zoologists & related professionals | 137 | 103 | 24.8 |
| Generic associate professionals | 2902 | 2187 | 24.6 |
| Administrative | 13823 | 10954 | 20.8 |
| Other occupations | 30479 | 24304 | 20.3 |
| Farming, forestry advisors & managers | 356 | 284 | 20.2 |
| Horticulturists, agricultural & forestry technicians | 2797 | 2233 | 20.2 |
| Archivists, curators and related professionals | 4 | 4 | 0.0 |
| TOTAL | 64637 | 49611 | 23.2 |

Figure 3.7: Vacancy rates per selected salary band (Economic Cluster data), 2003-2008, with a three-year forecast (ESSP, DEA 2010)

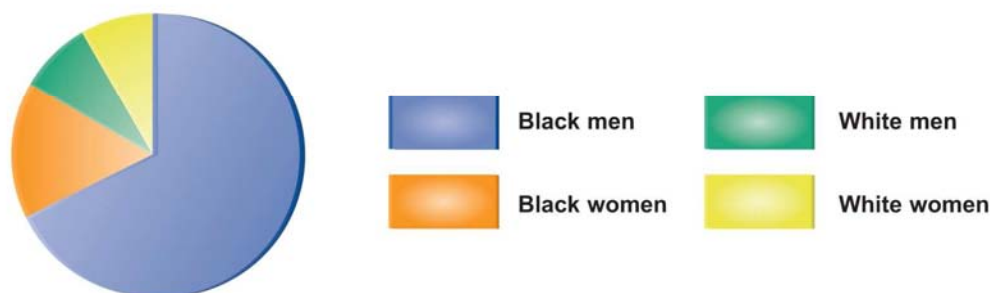


3.4.4 Trends in Transformation towards Social Equity

The biodiversity sector has traditionally been dominated by white males. It has come a considerable way towards gender- and race-based equity, but still has a considerable task ahead. This task is to bring in or develop more black male and female managers and professionals, with suitable qualifications.

- The percentage of black South Africans working in the biodiversity sector has increased from one third in 2000, to one half in 2007, with further growth to an estimated 59% in 2008/9
- The % of white male employees has decreased from just under half (47%) in 2000 to a third in 2007
- The % of black male employees has increased from 18% to 23%
- The % of black female employees has more than doubled from very low levels (7%) to 18%
- The % of white female employees has increased from 13% to 23%
- The % of women in the sector has increased from a quarter in 2000 to one third in 2007.

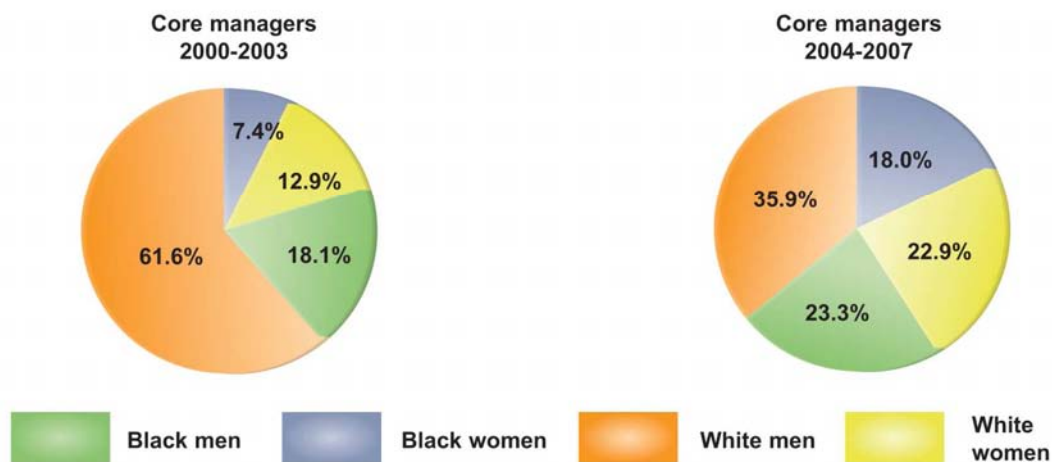
Figure 3.8: Biodiversity staff (managers, professionals, technicians) by race and gender, HSRC interview data 2008/9



Among *professional staff*, the space created by a decline in white male employees has been taken up mostly by black women, who have tripled, and to a lesser extent, black men. Among *technical staff* (associate professionals - entry level scientists with a diploma, B.Sc. or Honours degree) there has been an even more dramatic shift towards black women, who now make up 42% of these employees.

It is among the managers that progress is slower (see Figure 3.9 and Table 3.3), and substantial efforts are required to appoint suitably qualified black women in management and professional positions.

Figure 3.9: Comparison of biodiversity managers by population group and gender



In 2007 just over 40% of the biodiversity managers were black South Africans, according to the Labour Force Survey. This is an improvement on the 25% reflected in 2000-2003 data, but still far short of the equity targets (see Table 3.3). The management level remains male dominated, but white women have made inroads in both management and professional positions.

Table 3.3: Progress towards equity (2000-2007)

| | Black | | | | White | | | |
|------------------------------|-------|------|-------|------|-------|------|-------|------|
| | Men | | Women | | Men | | Women | |
| Employment equity target (%) | 40% | | 34% | | 7% | | 5.6% | |
| Sector employment (%) | 2000 | 2007 | 2000 | 2007 | 2000 | 2007 | 2000 | 2007 |
| Biodiversity managers | 18.8 | 23.3 | 7.4 | 18 | 61.6 | 35.9 | 12.9 | 22.9 |
| Biodiversity professionals | 26.2 | 35.5 | 3.5 | 12.7 | 43.5 | 31.5 | 26.8 | 20.7 |
| Biodiversity technicians | 68.4 | 31.6 | 15.6 | 28.9 | 16 | 26.4 | 0 | 13.1 |

3.4.5 Trends in Qualification Levels

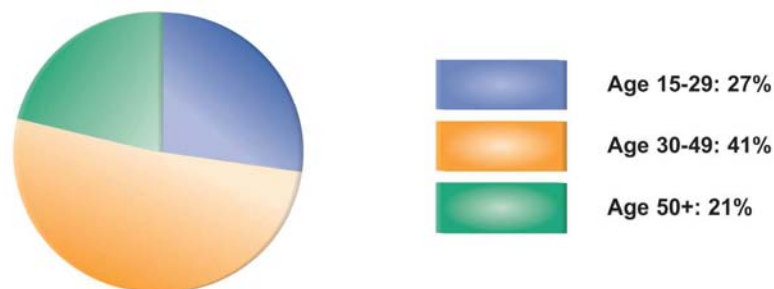
The sector is experiencing a decline in qualification levels. In 2000, 40% of biodiversity professionals had a post-graduate qualification. By 2007 the portion of professional staff with a post-graduate qualification had reduced to only 34%. Although employers indicate a preference for graduates (e.g. B.Tech. and B.Sc.) and post-graduates, the dominant qualification in the sector is a national diploma. Increasingly, staff are being employed with no post-matric qualification; this group more than doubled from 2000-2007, and includes 10% of managers. Based on an analysis of qualifications at various occupational levels, the HSRC estimates that more than 30% of people working in the biodiversity sector are not qualified to take on the responsibilities for which they have been appointed.

The phenomenon of limited qualifications has serious implications for delivery, given the sector's growing and more complex mandate. It may explain various departments' high expenditure on consultants, and it is likely to seriously limit the sector's capacity for law enforcement, compliance and advocacy.

3.4.6 Age Profile

Contrary to popular perception the biodiversity sector is not ageing. The age distribution reflected in Figure 3.10 is quite common across sectors.

Figure 3.10: Age profile of the biodiversity sector



When the age profile is read in relation to the trend of declining qualifications, as well as high turnover among managers and professionals, limited mentoring capacity in the sector clearly emerges as a critical issue. The sector has a large percentage of inexperienced managers, and few staff with mentoring capacity (older than 50 group), particularly in the public sector. This places a big burden on the professionally active 30-49 year old group, who also carries the main responsibility for delivery, and the problem is exacerbated by high levels of vacancies and turnover.

3.4.7 Scarce and Critical Skills

Critical skills are skills required within occupations. South Africa has adopted a new approach to nature conservation, and government and other role players have growing and more complex mandates regarding biodiversity. This includes mainstreaming biodiversity concerns into development and planning, ensuring that biodiversity conservation benefits society including the poor, demonstrating the economic and social value of biodiversity, and managing ecosystems as complex rather than static systems (see Transformation Driver, Section 3.1). Within these trends, the following have emerged as critical skills in a range of occupations:

- Knowledge of and ability to work with a growing array of policies and legislation
- Social learning facilitation, communication skills; knowledge brokering and advocacy in political, economic and other social contexts
- Management skills, including financial and project management skills
- Technical skills pertaining to specific occupations
- Integration skills (across levels, sectors, organisations, roles)
- The ability to work in contexts of uncertainty and complexity.

The term ‘**scarce skills**’ refers to competencies associated with occupations that are in short supply. The following scarce skills have been identified by the HSRC, using various data sources including earlier reviews by other authors, as well as further stakeholder consultations. Scarcity can be absolute (virtually no skills in the country) or relative – the skills are available, but for some reason the biodiversity sector cannot attract or hold on to them. An attempt is made here to distinguish between them, but it is not yet obvious in all cases in which category a particular scarce skill belongs.

ABSOLUTE SCARCITY

RELATIVE SCARCITY

| | |
|---|--------------------------------|
| 1. Agricultural extensionists | Biodiversity monitors |
| 2. Curators of physical and research collections | EIA practitioners |
| 3. Database developers & managers | Protected area managers |
| 4. Environmental resource economists | Software designers |
| 5. Ecosystem managers, researchers (post-graduate) | Social ecologists |
| 6. Estuary managers and wetland specialists | Web designers |
| 7. Environmental education, HCD & curriculum specialist | Wildlife veterinarians |
| 8. Geneticists | |
| 9. GIS specialists and technicians, remote sensing specialists | |
| 10. Intellectual property and indigenous knowledge specialists | |
| 11. Monitoring specialists | |
| 12. Soil scientists | |
| 13. Statistical ecologists, bio-systematists and modelers | |
| 14. Taxonomists for marine and terrestrial systems | |
| 15. Policy analysts | |

The HSRC recommends that this list of scarce skills be refined, using a specific methodology that requires better identification of skills needs in organisations, and better forecasting of skills in the sector. The newly established HRD Network can play a role in the former, while scenario planning exercises could be built into the proposed National Skills Summit (see Chapter 8). Reference should also be made to the broader scarce skills lists in the Environmental Sector Skills Plan (DEA, 2010).

3.4.8 Recommendations based on Demand Side Analysis

Proposed Focus Areas

- ‘Cream of the crop’ – The sector needs to focus on attracting suitably qualified post-graduates. This may have to include selecting from the many post-graduates from elsewhere in Africa and the world who qualify at South African universities.
- ‘War for talent’ – The sector needs to give more attention to incentives and strategies for diversity management and talent management. In particular, it needs to take seriously the need to create welcoming organisations where black South Africans will feel proud to be part of the sector, and able to make a positive contribution to its transformation, through more than simply making up the numbers.
- ‘Operation upgrade’ – Invest in programmes to up-skill under-qualified staff through (for example) a Level 6 learnership, Honours, Masters and doctoral level programmes. These programmes, too, should give attention to the sense of belonging and worth of black

South Africans and consideration should be given to a prestigious Masters in Conservation Leadership as a flagship programme to address multiple issues.

- ‘Grow your own timber’ – Improve career pathways, succession planning, skills development and mentoring in organisations; the proposed HRD Network can be used to share related best practices among organisations.
- Create new posts where there are clear needs e.g. EIA practitioners to implement the Coastal Act, managers, compliance and monitoring staff for expanded protected areas, managers for the Expanded Public Works Programmes.
- Integrate biodiversity considerations and environmental resource economics into training for other professions e.g. urban planning and general environmental management courses.

Further Research, Consultations and Lobbying Required

1. Refine the scarce skills list (in 3.4.7) in consultation with stakeholders
2. Develop a system to gather better employment statistics in the sector (40+ organisations)
3. Probe more deeply the reasons for high vacancy levels in the public sector. This could include an analysis of income streams in the biodiversity sector, compared to competing agencies.
4. Explore the feasibility and value of standardising occupational descriptions to enable monitoring of the HCDS (among organisations)
5. Explore sector wide agreement on the levels of competence required within a common set of occupations, in order to determine exact needs and monitor progress
6. Ensure that biodiversity occupations are adequately captured in the Organising Framework for Occupations (OFO)
7. Lobby Statistics South Africa to capture industry data at the 6-digit level
8. Investigate the role of professional registration with SACNASP (the South African Council for Natural Scientific Professions) as an incentive for improving qualifications, bearing in mind that much of the emergent trans-disciplinary functionality evident in the sector falls outside the standard classification of professions.

3.5 SUPPLY SIDE ANALYSIS

This analysis draws on the stakeholder engagement with partners in the biodiversity sector including universities; the sectoral research conducted by the HSRC (Vass et al., 2009) and the studies that informed the Environmental Sector Skills Plan (DEA, 2010), including research on the quality and relevance of programmes in higher education (Rosenberg et al., 2009b).

The following must be taken into account regarding the supply side analysis:

- The source of data on graduation trends is HEMIS, the Higher Education Management Information System. While HEMIS data is relatively disaggregated, it is nonetheless difficult to demarcate study fields relevant to the biodiversity sector. For example, studies in the social sciences, or computer sciences, can also be relevant, but would not always be.

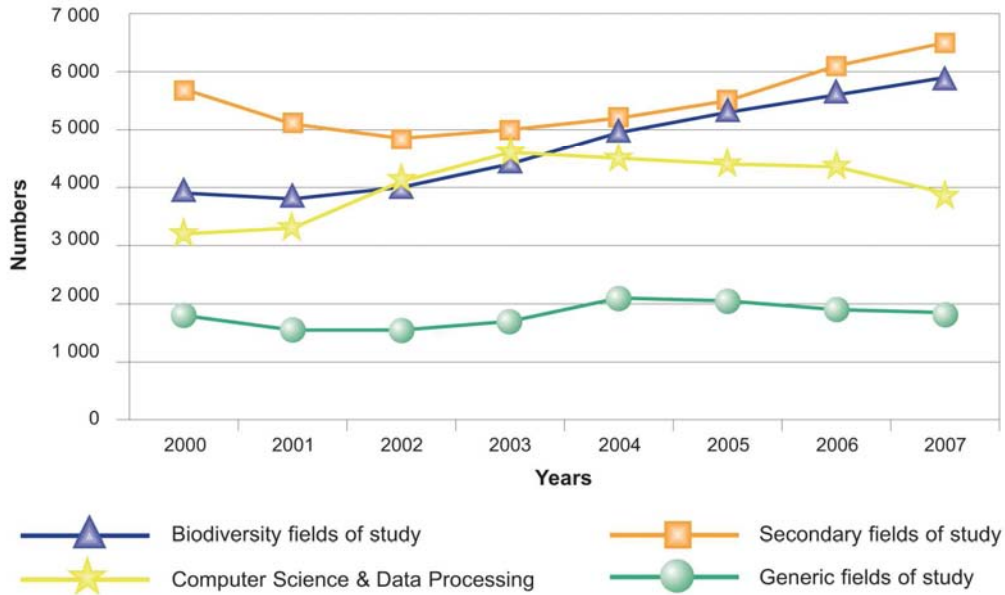
The HSRC's analysis included 16 study fields which were regarded as *specifically biodiversity related*. These include Botany, Zoology, Life Sciences, Biological Sciences, Horticulture, Oceanology, Wildlife, Natural Resources, Soil Sciences, Forestry and Fisheries, but also Geography and Agricultural Extension. The HSRC study also considered a selection of *secondary fields* of study (such as Geology, Physics, Atmospheric Sciences, Economics) and three *generic* fields of study (Other Social Sciences and Social Studies; Computer Science and Data Processing; and Public Administration).

- We do not have empirical data on graduates' decision making processes regarding the biodiversity sector specifically, e.g. how they choose a study field or career, or why they do or do not embark on post-graduate studies. Other research was consulted where available (Cosser, 2009; Cosser & Du Toit, 2002), but it will be valuable to use engagement with school leavers and graduates in the BHCD Programme to gain more specific insights.
- The term 'universities' is used here to refer collectively to comprehensive universities (which provide all offerings), academic universities, and universities of technology.

3.5.1 Trends and Issues in the Supply of Graduates

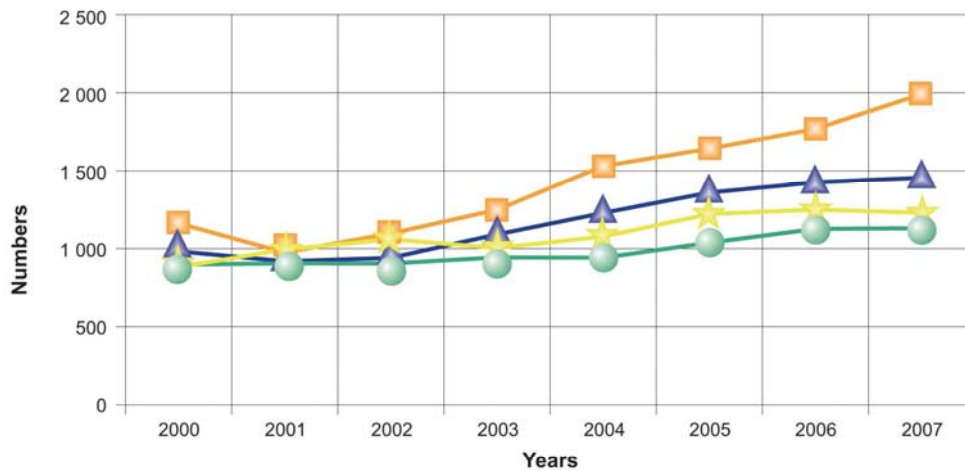
There has been an increase in graduates in biodiversity related study fields, with annual growth at an average of 5.8%. Figure 3.11 shows the trends in graduations in biodiversity specific fields, secondary fields and generic fields of study. In biodiversity specific study fields, the growth was from 3 971 graduates in 2000 to 5 882 graduates in 2007.

Figure 3.11: Graduation trends in biodiversity related, secondary and other study fields, 2000-2007



There has also been an increase in the number of black students enrolling and graduating in biodiversity related study fields, to the extent that enrolments in biodiversity related fields are now dominated by black students. This was largely due to enrolments by black women, which increased by 10% per annum on average, and to a lesser extent by an increase in enrolments by black men (7.6% per annum on average). Enrolments by white men and white women increased more slowly, by 1.8% and 2.7% per annum, respectively.

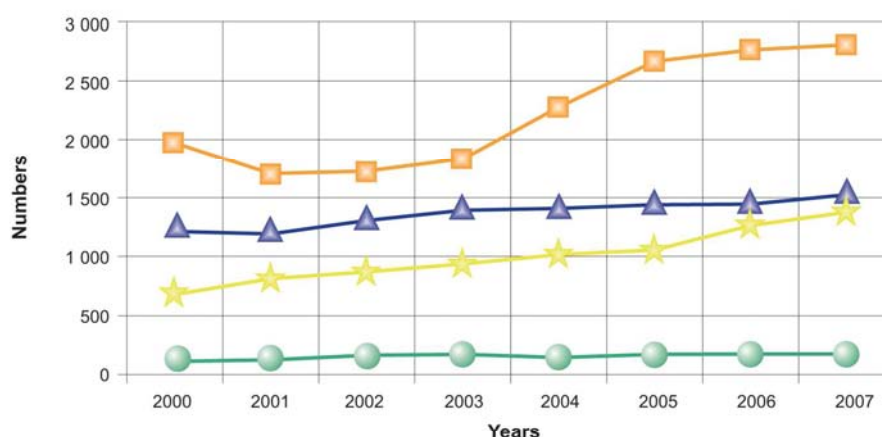
Figure 3.12: Trends in the number of graduates across all qualifications in biodiversity related study fields by population group and gender, 2000-2007



| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|------------------------|-------|------|-------|-------|-------|-------|-------|-------|
| Black men: Graduates | 983 | 919 | 941 | 1 091 | 1 229 | 1 360 | 1 426 | 1 455 |
| Black women: Graduates | 1 162 | 975 | 1 097 | 1 249 | 1 530 | 1 642 | 1 768 | 1 992 |
| White men: Graduates | 898 | 906 | 905 | 944 | 942 | 1 038 | 1 126 | 1 131 |
| White women: Graduates | 883 | 994 | 1 060 | 1 004 | 1 077 | 1 222 | 1 250 | 1 230 |

The bulk of qualifications in the growing number of biodiversity related graduations are a first degree or national diploma. Unfortunately the growth in first degree and diploma graduates is not matched by a growth in Honours, Masters or Doctoral qualifications. This means that despite the growth in numbers, and the racial transformation in the student cohorts, the higher education supply is probably not matching the demand for high skills in the biodiversity sector.

Figure 3.13: Levels of qualifications in biodiversity related study fields, 2000-2007



| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| ★ National Diplomas | 676 | 810 | 868 | 936 | 1 015 | 1 054 | 1 262 | 1 376 |
| □ Degrees/Higher Diplomas | 1 971 | 1 705 | 1 726 | 1 833 | 2 277 | 2 667 | 2 764 | 2 807 |
| ▲ Honours/Master's Degree | 1 212 | 1 191 | 1 305 | 1 392 | 1 408 | 1 439 | 1 444 | 1 524 |
| ● Doctorates | 112 | 125 | 164 | 172 | 145 | 172 | 174 | 175 |

The 'stasis' or bottleneck at post-graduate level is illustrated in the following table from the ESSP document (DEA, 2010):

Table 3.4: Comparative graduation figures in the Biological Sciences, 2001 and 2006

| Number of Graduations: Biological Sciences | | |
|--|------|-------|
| | 2001 | 2006 |
| First degrees, higher diplomas | 549 | 1 318 |
| Professional qualification, Honours | 393 | 446 |
| Masters | 243 | 243 |
| Doctorates, post-doc. | 83 | 89 |

A drop in numbers from under-graduate to post-graduate programmes is considered normal, but Figure 3.13 shows the gap to be very big. It is also particularly significant for this HCD strategy, given its focus on high level skills. The reasons why so few graduates go on to post-graduate studies are not empirically established, but experience and secondary information suggest the following:

- **Higher education capacity** - Many universities cap the numbers in their post-graduate programmes. The Council on Higher Education reports that the ability of the system to increase post-graduates is constrained by the number of staff qualified to supervise masters and doctoral studies. Higher qualified staff are also unevenly distributed among institutions. For example, 8% of staff at universities of technology have doctorates, compared to 21% at academic universities (CHE, 2009). The NRF's research chairs and centres of excellence aim to strengthen supervision capacity.
- **Lack of motivation** – South African graduates are offered employment, often in senior positions, before they obtain a second degree, and there is therefore not a strong incentive for further study.
- **Lack of finances** – Many students cannot afford to study further once they complete a first degree; they may have significant financial commitments including family responsibilities, and bursaries are often not enough to fully cover study related expenses.
- While some informants indicated that the sector has adequate **access to funding** for post-graduate studies and research, the following has been noted:
 - Bursaries are insufficient and need top-up funding from other sources
 - Few if any bursaries are being allocated to students who have taken more than the minimum period to complete their initial degree
 - Most bursaries are available for Masters and PhD studies, and there are fewer for Honours studies
 - There are few if any bursaries for part-time study. This is a significant problem, given the fact that many of those who need to improve their qualifications, are already in employment in the biodiversity sector, and may be difficult to replace during their study period.

Currently only half of those who enrol at a South African university obtain a first qualification. Along with the fact that far fewer than half of South African scholars pass matric, and very few (as few as 2,5% of those who write matric) pass Mathematics Higher Grade, this explains why there is a relatively small pool of graduates who can progress into post-graduate studies.

In the scarce skill area of computer sciences and data processing, there is very little growth in graduations, as evident from Figure 3.11. The numbers of graduations were 3 142 in 2000, and 3 941 in 2007. In 2007 the number of graduations (at all levels) with majors in ITC and Botany, or ITC and Zoology, or ITC and Geography, was 112 in total.

There are significant limitations to the career guidance on offer to most scholars and students. Career and study guidance is a component of the Life Orientation subject in schools, but this subject tends to be poorly taught in many schools and the majority of black scholars seem to gather the bulk of their information on further studies from mass media sources. Useful online advice is freely available to those in the know, e.g. the PACE Careers Centre (www.gostudy.com) which covers a number of conservation and science related careers, and provide access to university sites. Universities tend to have limited information on environmental study and career options, even if the institution offers a variety of environmental programmes. For more on career and study guidance in the environmental sector in general, see Rosenberg et al. (2009c).

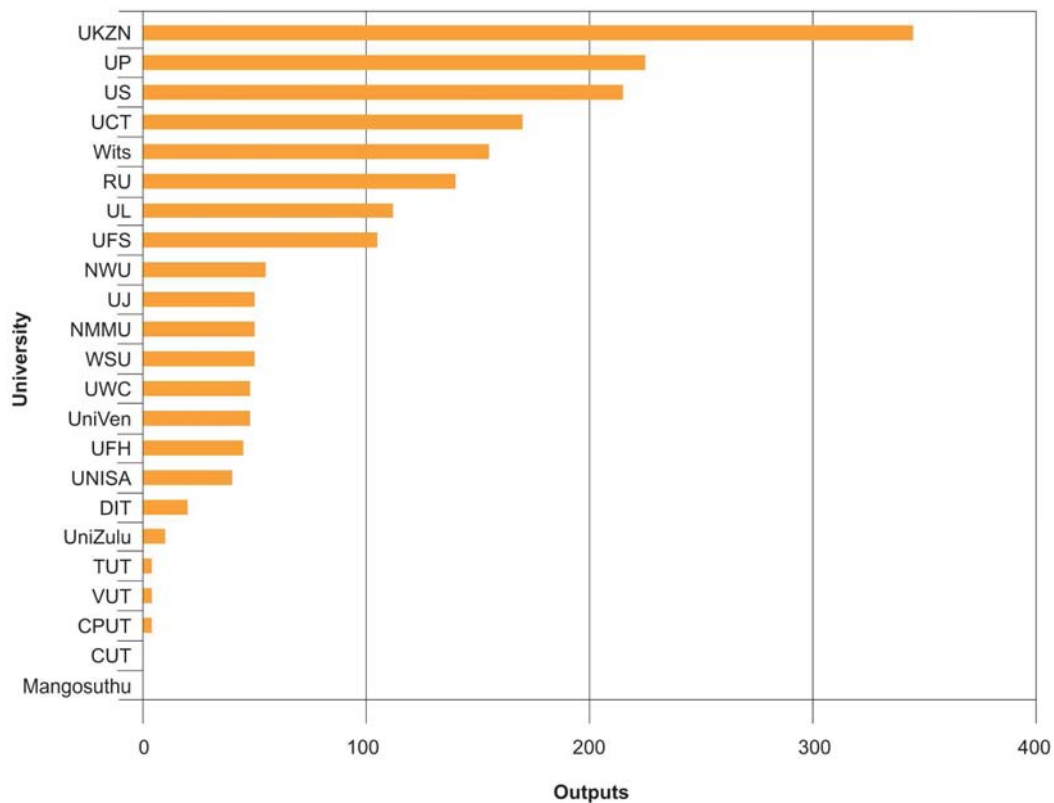
For some students a biodiversity course was a second or third choice after a better known or more popular option. However, a survey of employees in the environmental sector (conducted for the ESSP study) showed that many have chosen their career because of a passion for the environment or concerns about broad environmental issues, while others develop a commitment to the field once they get to know it.

The stakeholder engagements for this strategy revealed a perception among young black school leavers that the biodiversity sector is female dominated and 'for women'; this is in part borne out by the figures of increasing enrolments by black females in biodiversity related study fields.

3.5.2 Source of the Supply – Higher Education Institutions

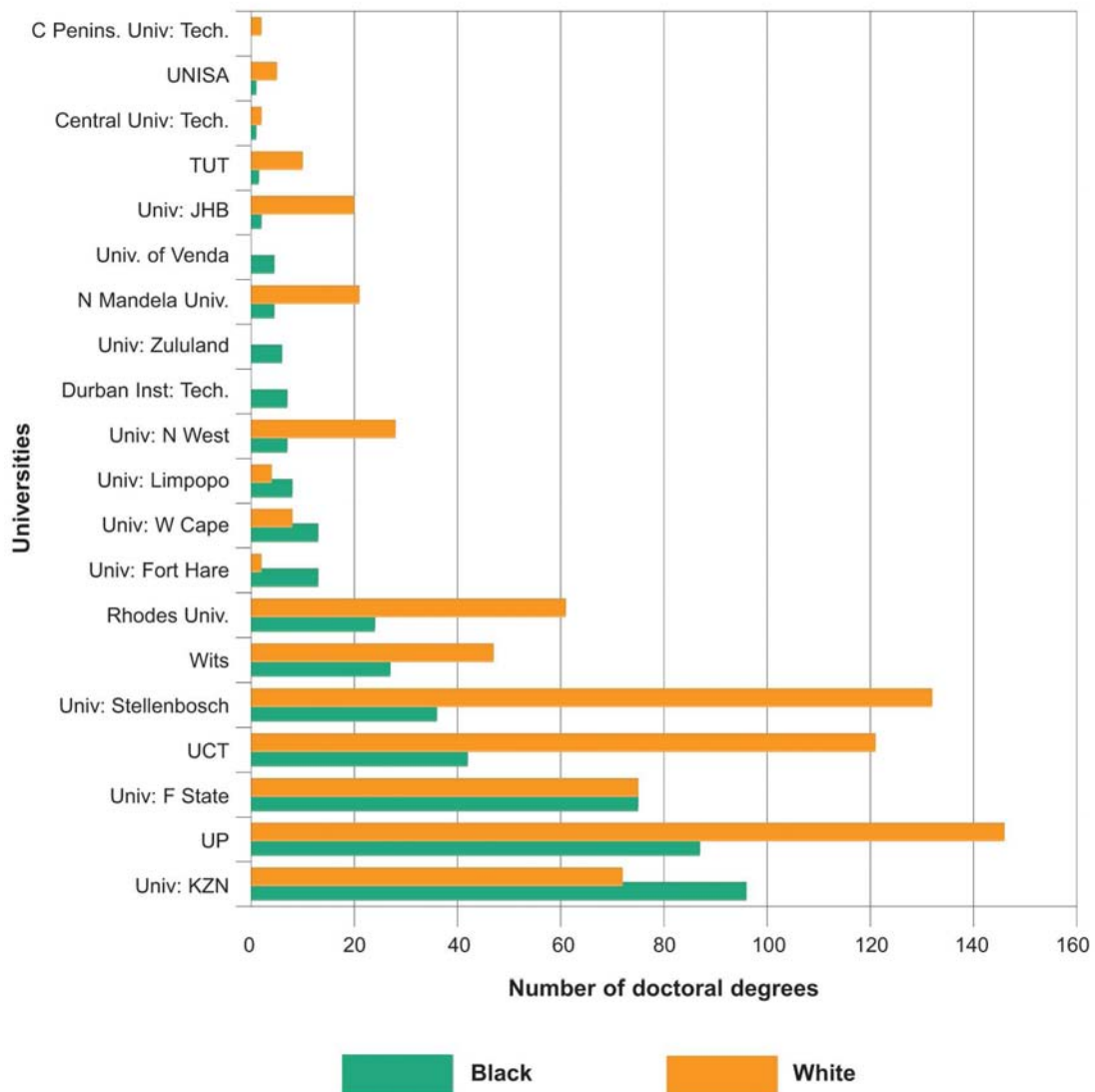
All universities supply biodiversity related skills to the sector, but they differ considerably in the extent to which they do so. Figure 3.14 illustrates the variations between institutions.

Figure 3.14: Number of graduations in the Biological Sciences, per university, in 2007 (provided by Rhodes University ESSP research team)



All universities are also making contributions to the body of black South African graduates and post-graduates, but again, with varying successes between them. Figure 3.15 indicates that while a number of universities make significant contributions to doctoral degrees in the biodiversity sciences, the University of KwaZulu-Natal stands out in the production of doctoral degrees by black students.

Figure 3.15: Average number of doctoral degrees in biodiversity-related fields of study by HEI and race, 2000, 2007



What are the reasons for the University of KwaZulu-Natal’s exceptional track record in attracting black students who eventually graduate with a doctoral degree in a biodiversity related doctorate? The institution puts explicit emphasis on striving for social equity, from under-graduate level onwards. Like many other universities, it has extensive academic development and support programmes. It allows students with weaker academic backgrounds due to the schools they attended, longer to complete their first degree, and it also lowers the entry requirements for the Honours programme. It was found that such students tend to ‘catch up’ during the extra (Honours) year, after which they are as likely to succeed in further study as those who have had the benefit of better schooling. Other factors in the university’s successful transformation record include a large offering of diverse programmes in biodiversity-related study fields, and relatively easy student access to staff. There is recognition that the inspiration and guidance from individual staff can be vital in determining whether a student chooses to continue further study, at a particular institution.

3.5.3 Quality and Relevance of Skills Supplied

It is not adequate to simply look at the numbers graduating; the quality and suitability of the skills those graduates have, is also critical. There are a number of issues to consider here:

- The relevance of the skills produced at university, i.e. how well they match what is required in the workplaces in the biodiversity sector
- The job readiness of students when they enter the workplace
- The quality of skills produced at university.

Relevance of Skills produced by Universities

The overview of the sector and the demand side analysis showed the need for:

- New content (such as climate change science, conservation planning, adaptive management, urban conservation)
- Combinations of skills, some of which may be new (such as botany and computer sciences, or zoology and sociology)
- Integrative skills (e.g. the ability to work across various disciplines)

Several South African universities have responded to the need for new content by developing new programmes or adapting existing curricula, either driven by individuals' interests and insights, or by concerted institutional efforts. However, these responses are uneven across HEIs. Some institutions or departments are most comfortable with teaching the content that served them well in previous decades, raising complaints from students and employers alike. Such reputations are generally known in the sector, but new students are of course less well informed, or may not have alternative options. Providing information on course content, and fair feedback from ex-students and employers, may be a useful service in the sector (see also Section 3.3.5).

The emergence of inter-disciplinary or multi-disciplinary programmes such as environmental sciences, or conservation biology, is a prominent feature in HEIs. The skills produced in these programmes vary; some are highly sought after by employers, and others are blamed for producing superficial concepts. They are generally more popular among students, as they meet the needs of those with wide interests, are perceived to be more applied, and to be more likely to lead to employment. They are generally treated in faculties as being in competition with the more established disciplines (such as Geography or Botany) which tend to lose students to them. Given their potential role in developing the 'new breed of scientist' sought after in the field, the multi- and inter-disciplinary programmes should be investigated further, to determine their scope, quality, relevance, and learning outcomes. One key question to answer is whether specialisation in a discipline should precede or follow an inter-disciplinary programme; another relates to the extent of integration that is desirable.

Job Readiness of Graduates

Most employers would like graduates to be ready to start work without much mentoring, but the reality is that universities can only prepare students to a certain extent, and some orientation to the world of work can only happen in the workplace. The demand side analysis showed that biodiversity organisations tend to lack mentors or experienced staff with the time to provide this orientation. Internships and research placements can help to prepare graduates, as can more attention to practical work (such as field trips) during study.

Universities of technology generally have a better reputation for prepared job-ready technical staff; for senior positions, employers require the kind of integrative, advocacy and leadership skills that may be best developed in post-graduate studies.

Quality of Graduate Skills

Employers in the sector are adamant that the quality of skills produced at universities differ from institution to institution. Where skills are inadequate, they are described as concepts that are too 'shallow' or 'superficial', and generally traced back to specific universities. Other universities report that their students are 'sought after' and 'snapped up' by employers before they can be encouraged to enrol for further study.

What makes the difference between a university that is able to produce high quality, relevant skills, and one which isn't? What are the characteristics of those departments or other units in all universities which stand out in terms of their popularity among students, funders and employers, their throughput rates and their numbers of post-graduates, and those that do not? The following features were identified in the various sources informing the BHCDS:

- **Resources:** Government has worked hard to reduce funding differences between universities. However, HEIs must obtain a large part of their budget from external sources, and have differing capabilities to attract this 'third stream' income. For example, while the top five research institutions raise on average 45% of their income from external sources, the University of Limpopo raises only 13% of its income from external sources; the figures among universities of technology are generally lower and ranges from 7% at the Durban University of Technology to 23% at the Cape Peninsula University of Technology (CHE, 2009). HEIs also make different decisions about how they spend their funds. Universities of technology generally lack budgets for journals and other research resources, for example.
- **Access to Networks:** Units with good external contacts, involving other research groups, funders and biodiversity organisations (e.g. through doing contract work in the sector) create opportunities for themselves and their students. Those who are more isolated, either because of a rural situation, or historical lack of involvement in the field, fail to create such opportunities or to even consider doing so. Maintaining involvement in these networks is however time consuming and can reduce staff's availability to support students; the exceptional individuals who are both active in professional and research circles, and available to provide quality supervision and teaching to students, are at the heart of productive higher education units.
- **Staff:** Progressive leadership is important, as is the ability of the unit or university to appoint staff with good reputations as researchers, good teaching skills, up-to-date knowledge, a passion for their field, and good networks (see above). Staff shortages limit the numbers of post-graduates in particular, but it is often an individual staff member with a mix of the above qualities, who makes a difference in a unit's ability to attract and retain good students.
- **Curriculum Content:** The more successful departments are involved in ongoing curriculum review, and evaluation of courses is approached as a generative process, rather than merely a form of compliance. Curriculum content is informed by staff's active involvement in research, professional associations and professional activities in

the field. We did not note differences in the throughput rates of inter-disciplinary versus disciplinary programmes, but the former were more popular among students. Quality of skills differed from one inter-disciplinary programme to another, and early insights suggest that the presence of a coherent framework within which students make sense of the varied content in an inter-disciplinary course, may be important.

- **Methodology:** Attention is given to varied methods to achieve success with students with different needs, backgrounds and learning styles. Exposure to project work, some research activities, field work and the potential world of work, are all regarded as important, even at under-graduate level, as are extensive reading, writing, interaction and challenging problem-solving activities. Departments with lower success rates tend to focus on lecture style teaching only, either to cope with large numbers or because no alternative seems possible.
- **Academic Development and Support:** Most HEIs have these in place, and we could not distinguish between them in terms of quality or success rates. A sound combination seems to be the availability of bridging years and bridging programmes; language support for African students; general academic, science and computer literacy support for those from weaker schools; and subject specific support from dedicated tutors in the faculty.
- **Matriculants' Academic Background:** Many HEI staff ascribe the difference in the quality of skills they can produce, to the quality of the skills with which matriculants enter university. Universities with better reputations generally attract the strongest students and are able to set higher entry requirements. Lecturers believe they can discern the school background of students without checking. Some schools produce better academic skills than others, including knowledge of biological, ecological and environmental concepts. The quality of schooling is such a significant factor in the quality of graduate skills, that it is discussed separately, below.

3.5.4 The Base of the Pyramid – Quality Issues in Schooling

There is a clear connection between the quality of academic skills, literacy and numeracy produced in South African schools, and the ability of students to succeed at higher education. When South African learners participate in international benchmark tests, the average results are shockingly low, and they are outperformed by learners in most developed and developing countries in the world, including other African countries with far lower education budgets. The South African education system has not yet been able to overturn the legacies of apartheid, and the schools' results continue to show a bimodal curve, in which a small percentage of learners fare as well as their peers in the rest of the world, but the vast majority are lagging behind in literacy, numeracy and life skills.

The reasons for poor results are multiple and systemic (see Rosenberg et al., 2009a for an overview). A few factors will be highlighted here, because they are particularly relevant for human capital development in the biodiversity sector.

- South Africa is a multi-lingual country and children's ability to read and write well in English is clearly a significant factor which has not been addressed adequately by the education system. By the time learners with limited proficiency in the language of instruction (usually English) reach university they have gaps in their conceptual knowledge, resulting at least in part from not being able to read well.

- The majority of teachers currently in the system have been trained in the apartheid era and despite professional development efforts, many lack skills in developing foundational knowledge, literacy and numeracy in the first years of schooling; and in higher level mathematics and science or English skills. There are few incentives for trained mathematics and science teachers to continue working in schools. This is regarded as one of the reasons why such a low percentage of students take Mathematics and Science in school, or pass these subjects with exemptions.
- More matriculants take and pass Biology/Life Sciences (297 417 passed the subject in 2008; this was 70.5% of those who passed matric). This may explain why the Life Sciences is relatively popular as a study field among first-year students. However, lecturers complain about the depth of the concepts developed in *some* schools, and observed that many students do not have a grasp of the amount of effort that mastery of the academic subject requires.
- While biodiversity is part of the school curriculum across the grades and subjects, it is not consistently taught by teachers. Environmental content is often only addressed when service providers (such as environmental agencies or NPOs) work closely with schools and departmental officials. In such cases teachers respond very positively and welcome support, but where support is absent or inadequate, environmental content is not dealt with well, or at all. There is little or no capacity for environmental content in provincial and national structures of the education system, and the environmental content within the curriculum policy is at risk of poor interpretation or omission in the current national syllabus writing process.
- Government and others have set up special mathematics, science and technology schools (e.g. Dinaledi schools, LEAP schools) from which lessons can be learnt. LEAP has had success in preparing talented learners with a township background for entry into higher education. They invest in Life Skills, English, Mathematics and Science, and scholars spend extended hours on curriculum tasks.
- Research into what distinguishes the two cohorts of schools in the bimodal curve found that school management is a significant factor in whether a school performs well. This variable is more important than the socio-economic or racial background of the school's learners or feeder community. Good curriculum leadership, time in class and on task, and the qualifications of teachers, are also important factors in the success of schools, including schools in relatively impoverished areas. Other studies have grouped schools into three classes: those that are well managed, those with some form of management; and those where poor leadership, strife between staff and a general breakdown in systems are such that efforts to improve the quality of education simply fail. It is important to note this, as the Department of Education's policy has been to direct quality improvement efforts to the poorest performing schools; this observation suggests that only very fundamental interventions in these schools are worthwhile.

It is also possible to enter higher education from elsewhere, not only from schools. It is theoretically possible to enter a university programme after completing studies at a further education and training (FET) college, such as an agricultural college. In practice this seldom happens. Many FET colleges are constrained by limited staff skills and resources, particularly in areas relevant to the biodiversity field. Although there is room for environmental qualifications in the current opening up of curriculum development for FET colleges, and potential for protected areas and rural NPOs to form partnerships with rural-based colleges,

this is not currently a significant avenue of skills supply for the biodiversity sector, and will require large systemic investments before it can become one.

3.5.5 Trends and Issues in Workplace Training and Short Courses

Once biodiversity professionals are employed, training can and must continue, given the need to develop an understanding of workplace specific, institutional and governance issues, of geographical and ecosystem specific issues (where applicable) and of ongoing developments in the field, which is currently very dynamic. The options include further study at university, full-time or part-time, attending short courses offered by a range of providers, or participating in in-house training. The workplace is also for experiential training of interns or students. With regard to these pathways to supply skills, the following observations are relevant:

- A number of organisations have built up extensive experience in providing experiential training to students and interns; other organisations are only starting up programmes and seeking advice; another group of organisations seem to be running placements without attending to important requirements such as the need for adequate mentoring (see below).
- Students seeking experiential learning placements often struggle to find suitable opportunities and there is a need to expand these, with due attention to employment possibilities.
- Organisations seem to be losing in-house training potential. The HSRC reports that organisations are increasingly outsourcing training they previously provided themselves. Examples of existing in-house training include online-leadership training.
- All organisations report a shortage of senior staff who can mentor newcomers, or a lack of time among existing senior staff to spend with newcomers (given other responsibilities, chronic understaffing and, at times, lack of recognition for the mentoring role during performance assessment). Senior staff often mentioned with some frustration the time spent with newcomers who may leave the organisation after they have had the benefit of mentoring.

Short courses are a popular training strategy in organisations, to the point that the ESSP (DEA, 2010) refers to a 'short course culture'. Short courses may be used in lieu of in-house mentors, but are also an important way to gain exposure to new content areas, or develop new skills. They are provided by a range of providers, including biodiversity NPOs (such as WESSA), private consulting groups, often on commission by government departments, and universities. Some HEIs have units which specialise in short course offerings (e.g. the University of the North West's centre for environmental management training).

The following is worth noting:

- Short courses are an important strategy for responsive training; they can be flexible and responsive, as they can be developed relatively quickly. Customised short courses can be expensive, but cutting costs by offering standardised courses can lead to the common phenomenon where course participants are unable to assimilate and apply the learning in their own contexts.

- Short course participants (particularly less experienced employees) report that they find it difficult to string the learning from a range of disconnected short courses together in a coherent way (this might also be the case with disjointed longer courses).
- Short course participants also report that they at times find it difficult to apply the course content in the workplace (this can also apply to longer courses).
- Courses with dedicated mentors to help learners interpret their learning, over time, into the workplace, seem to be more successful, as are those of an iterative nature, alternating time on course with time on task in the workplace.
- Concerns have been raised, in various quarters, about the quality of some of the short courses on offer in the sector. There have been calls for greater educational guidelines to subject specialists who structure and present courses, and who often fail to cater for particular learner groups and needs.
- There is a need for course development, curriculum design and evaluation skills, as well as learning facilitation expertise.

There is also a need to strengthen the capacity of HR departments to make better decisions about the courses they choose for or offer to employees. A review of Workplace Skills Plans indicate that while environmental agencies spend considerable funds on training, training is often ad hoc and skills development inefficient. The choice of courses is mostly 'menu driven', and the menu is provided by training agencies which may or may not understand sectoral needs well. There is often a mis-match between the training being planned for staff, and their reported training needs. HR departments tend to choose generic courses that are often offered at too low a level. Biodiversity personnel are found to resort to using line function budgets to obtain the skills they require, once the training budgets have been exhausted for more generic programmes.

3.5.6 Recommendations following from the Supply Side Analysis

- The issue of retention and 'churning' among biodiversity professionals needs attention. Organisations need to recognise that the current generation of graduates tend to be more mobile, rather than signing up for life with a particular company. This does not necessarily reflect a promiscuity or lack of values. While staff are still in the sector, mentoring has not been a complete waste, particularly if a similarly mentored person from another organisation can be employed soon after. If mentoring is approached from a sectoral rather than an organisational point of view, this may lower frustration levels, maximise the value of inputs, and mobilise more mentoring resources.
- The high rates of mobility among the current generation of graduates do imply that organisations have to work harder to retain talent in the face of competition. In the war for talent, the biodiversity sector has much to offer, and school leavers are interested in more than simply money (Cosser, 2009; Cosser & Du Toit, 2002). South Africa is a sought-after destination for international research expertise and funding, and those who work in a biodiversity-related occupation can look forward to working with such expertise and benefit from such funding. Biodiversity graduates often have unparalleled opportunities to travel to stimulating environments around the world. Another value the sector holds is an ethical one: it makes a contribution in the interest of the country and its people.

- Different models for accessing and using mentors should be explored, and a strategy devised for mobilising more mentors for the biodiversity sector. Among them could be retired scientists and managers. Mentoring should be underpinned not by a 'deficit' perspective (i.e. mentors teaching newcomers 'how it used to be done') but from a transformational perspective: mentor and protégé both contribute to a better understanding of how things need to be done differently in the new context.
- Biodiversity career and study guidance could benefit from some national coordination, as well as specific efforts to improve biodiversity-specific study and career guidance in HEIs. There may be limited value in influencing career guidance in most schools, given the constraints in how Life Orientation is currently taught. There should be ongoing inputs into existing career guidance initiatives (such as PACE), to ensure that information about the sector is up-to-date and appropriate for the various target groups and their needs at a particular time. The Career Guidance Working Group which has been established in partnership with BHCDs, the draft document produced from their deliberations, and the research informing them, should be used to guide these efforts.
- Innovative approaches to introducing young people to the biodiversity sector need to be considered. A system of clubs, which combine fun opportunities to interact with other young people; meeting inspirational biodiversity professionals; exploring South Africa's biodiversity from diverse points of view, in the context of the socio-economic development of the country and its diverse communities, with the opportunity to improve one's general knowledge, academic skills and social networks, should be considered.
- Bursaries and scholarships should be focussed at the post-graduate level. They should aim to:
 - Encourage graduates to undertake post-graduate studies in biodiversity-relevant study fields (including some social sciences) and to eventually take up employment in the field. They should therefore be accompanied by bursar support programmes which inter alia introduce bursars to the opportunities in the field, and help to build a sense of identification with the sector among black South African graduates.
 - Contribute to the up-skilling of personnel already in the sector.
 - Complement and extend existing funding for the sector, e.g. top up NRF bursaries that are not adequate for mid-career professionals with financial responsibilities.
 - Fill gaps, e.g. provide bursaries at honours levels, bursaries for students who required longer than the stipulated time to complete a first degree but have academic potential, and bursaries for part-time study.
 - Support students who can make a contribution to the sector, once trained; this should be a key criterion in awarding the bursary.
 - Support those HEIs who have adequate capacity to provide quality tuition and supervision to post-graduate students. (Measures must be undertaken to improve the supervision capacity of other HEIs.)
- At the under-graduate level, investment should aim to:
 - Encourage under-graduates in the biodiversity field, to study further and seek employment in the field. In addition to the bursaries noted above, provide guidance, and under-graduate exposure to the organisations and

leaders in the sector, for example through site visits, project work and field work.

- Support studies into scarce fields as identified in the scarce list; studies in scarce skills areas could receive under-graduate bursaries.
- Further explore the contributions of inter- and multi-disciplinary courses with an existing or potential biodiversity focus. Do they adequately meet the critical skills needs in the sector, or could they be improved? If a new Masters programme is considered, it should be a prestigious offering, similar to outstanding programmes in business schools, that aims not only to enhance skills, but also to build a strong sense of identity and pride in the sector among participants. A focus on Conservation Leadership may be appropriate.
- Encourage curriculum innovation in departments with outdated curricula, and stronger academic support programmes in those institutions with low throughput rates in biodiversity programmes.
- Guidelines for the development, delivery and evaluation of short courses for the biodiversity sector should be developed by those with technical expertise in this field, along with an investment in extending this expertise.
- A database of reputable short course providers with information for potential students and HR departments should be developed. A website could be used to advertise courses, but also to rate them and provide feedback on their strengths and weaknesses, and to guide HR departments and prospective students on how to make informed decisions.
- Engage as a sector with the Department of Basic Education and Training, text book writers, faculties of education and service providers to strengthen the general environmental and specifically biodiversity related content of curricula, teachers' courses and the content of teaching materials including work books and textbooks, which are now set to play a greater role in schools, similar to their role before the advent of outcomes-based education. Encourage collaboration and avoid multiple environmental agencies engaging separately with the Department.
- When working with schools, invest in those that have adequate management capacity.

CHAPTER 4: VISION, STRATEGIC GOALS AND OBJECTIVES

4.1 VISION

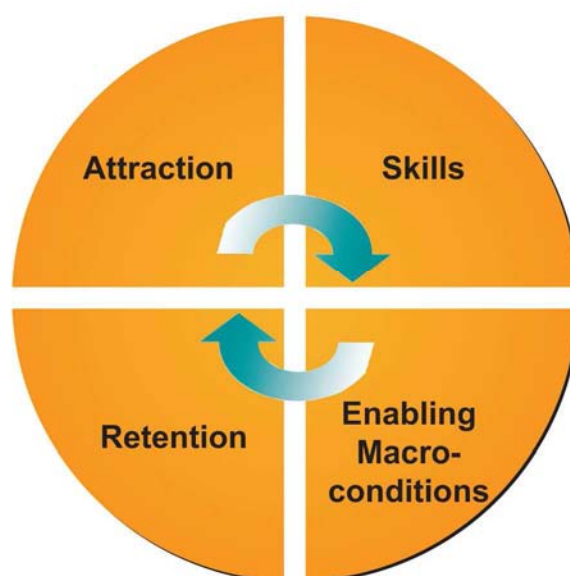
The vision pursued by the human capital development strategy for the biodiversity sector is a socially equitable¹¹ and suitably skilled workforce of biodiversity leaders, professionals and technicians to optimally implement the sector's expanding and increasingly complex mandate.

4.2 STRATEGIC GOALS

This vision is to be pursued through four strategic goals:

- To increase the number of talented black South Africans *attracted* to working in the biodiversity sector
- To improve the *quality, levels and relevance of skills* for the sector
- To improve the *retention and effective deployment* of suitable individuals in the sector
- To create *enabling macro-conditions* for skills planning, development and evaluation.

Figure 4.1: Four connected strategic goals



¹¹ In this strategic vision a socially equitable workforce is one in which discrimination on the basis of the social classifications of gender and race has been eradicated, so that the workforce is representative of society at large.

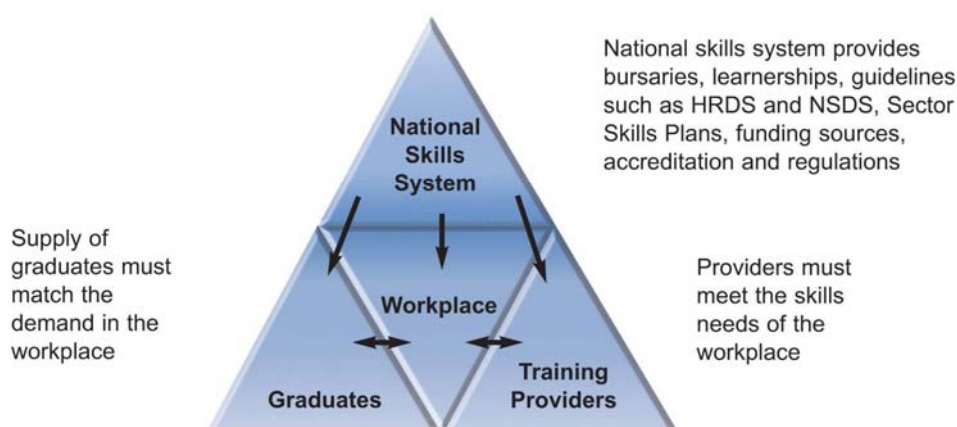
The rationale for these goals and the groups on which they primarily focus, are summarised in Table 4.1.

Table 4.1: Four strategic goals: Rationale and focus groups

| Goals: | Problem Statements: | Primary Targets: |
|---|---|---|
| 1. Increase the number of talented black South Africans <i>attracted</i> to the sector. | The pool of talented young people, particularly black South Africans, with an interest in careers in the biodiversity sector, is relatively small (see Section 3.3). | Black South Africans, particularly those in school and university, and those who work with them. |
| 2. Improve the <i>quality, levels and relevance of skills</i> available to the sector. | There is a lack of required skills (scarce skills), both established and new, and unacceptably low levels of skills in organisations (under-qualified staff – Section 3.2). | Employees; as well as universities and other providers of training for the sector. |
| 3. Improve the <i>retention and effective deployment</i> of skills in the sector. | Suitable individuals leave the sector, or are unable to use their skills, because of workplace conditions and cultures (Section 3.2). | Employees and employing organisations - senior management and human resources/HR development staff |
| 4. Create <i>enabling conditions</i> for skills development and evaluation <i>for the sector as a whole</i> . | The biodiversity sector is all but absent in national planning for skills provisioning (Section 3.1). | The national skills planning and development system – DHET, DBE, DL, QCTO, SAQA, SETAs, StatsSA and others. |

The strategic goals reflect the systemic approach followed in the BHCDS (Figures 3.1 and 4.2). The *connections between them* are also addressed by the BHCDS:

Figure 4.2: Four Strategic Areas and Connecting Considerations



4.3 STRATEGIC OBJECTIVES

Strategic Objective 1 (Promotion: Attraction and Meta-conditions)

Promote the biodiversity sector among key decision-makers and all South Africans, especially black South African school leavers, students and graduates, and leaders in the national skills development system, as a sector with a strong vision of transformation and opportunities for fulfilling work that contribute to the national development agenda.

Strategic Objective 2 (Up-skilling)

Extend existing capacity: Improve the skills of those already in the workplace, and under-qualified or under-skilled, in a manner that contributes to social equity, a sense of belonging and pride in the sector.

Strategic Objective 3 (Retention)

Improve retention and effective deployment of suitably skilled people in the sector through organisational design, skills planning, development and human resource development processes.

Strategic Objective 4 (Skills Provision)

Increase the relevance and quality of educational provisions in a wider range of higher education institutions and other training providers, in a manner that will improve pass rates and entry into post-graduate studies.

Strategic Objective 5 (Skills Provision)

Contribute to better science, mathematics, literacy and environmental learning in schools with adequate management capacity.

Strategic Objective 6 (Meta-conditions)

Increase the impact of the collective effort of HCD initiatives relevant to the sector, through articulation (connecting initiatives) and promotion.

Strategic Objective 7 (Skills Provision)

Increase the supply of scarce skills through targeted higher education initiatives in priority areas identified through ongoing needs analyses.

Table 4.2 (below) shows that a number of strategic objectives are aimed at achieving each of the strategic goals; some strategic objectives address more than one strategic goal.

Table 4.2: Relationship between Strategic Vision, Goals and Objectives

| |
|---|
| <p>Strategic Vision: The biodiversity sector has a socially equitable and suitably skilled workforce of professionals and technicians to optimally implement its complex and expanding mandate.</p> |
| <p>Strategic Goal 1: Increase the number of talented black South Africans attracted to working in the biodiversity sector.</p> |
| <p>SO1: Promote the biodiversity sector among key decision-makers and all South Africans. Primary focus: Black South African school leavers, students and graduates.</p> |
| <p>SO4: Increase the relevance and quality of educational provisions by a wider range of HEIs and other training providers, in a manner that will improve pass rates and entry into post-graduate studies.</p> |
| <p>SO5: Contribute to better science, mathematics, literacy and environmental learning in schools with adequate management capacity.</p> |
| <p>Strategic Goal 2: Improve the quality and relevance of skills produced for the sector.</p> |
| <p>SO2: Extend existing capacity: Improve the skills of those already in the workplace, and under-qualified or under-skilled, in a manner that contributes to social equity, a sense of belonging and pride in the sector.</p> |
| <p>SO4: Increase the relevance and quality of educational provisions by a wider range of HEIs and other training providers, in a manner that will improve pass rates and entry into post-graduate studies.</p> |
| <p>SO5: Contribute to better science, mathematics, literacy and environmental learning in schools with adequate management capacity.</p> |
| <p>SO7: Increase the supply of scarce skills through targeted HE initiatives in priority areas identified through ongoing needs analyses.</p> |
| <p>Strategic Goal 3: Improve the retention and effective deployment of suitable individuals in the sector.</p> |
| <p>SO2: Extend existing capacity: Improve the skills of those already in the workplace, and under-qualified or under-skilled, in a manner that contributes to social equity, a sense of belonging and pride in the sector.</p> |
| <p>SO3: Improve retention and effective deployment of suitably skilled people in the sector through organisational design, skills planning, development and human resource development processes.</p> |
| <p>Strategic Goal 4: Create enabling conditions for skills planning, development and evaluation for the sector as a whole.</p> |
| <p>SO1: Promote the biodiversity sector among key decision-makers and all South Africans. Primary focus: Decision makers in the national skills planning and development system.</p> |
| <p>SO6: Increase the impact of the collective effort of HCD initiatives relevant to the sector, through promotion, articulation and evaluation.</p> |

CHAPTER FIVE: PROPOSED ACTIVITIES

This chapter introduces proposed activities (to be developed into projects) according to the strategic goals and objectives they need to address. It should not be regarded as a complete list of possibilities; as new opportunities, possibilities and dimensions of issues come to light, more projects can be proposed and developed, provided they clearly address one of the strategic goals and the strategic vision.

On the other hand, if the activities already listed here are effectively implemented, there will be a significant impact on capacity and transformation in the sector. Hence efforts should be focussed on refining and implementing the current proposals, rather than on generating new proposals.

Nearly 40 activities/projects are proposed here, and the implementation plan (Chapter 8) shows that all of those listed would ideally come on stream within the next two years. *This is a large number of projects for a focussed strategy.* The following should be taken into account, however:

- Some activities are lobbying processes. They do not require large budgets or staffing commitments, but they are keys to unlocking support for other activities and biodiversity sector HCD in general. They should be undertaken as a matter of urgency; some have in fact already started during the strategy development phase.
- A number of proposed activities are larger projects requiring larger funding and staffing inputs. Examples are bursaries, internships, mentorships, workplace training programmes and curriculum innovation. These will take time to establish and will only bear fruit in 5 to 10 years time. For these reasons, work on these projects needs to start early. Many of them can build on existing initiatives, but in several cases, we do not yet have adequate information to decide how to move forward, or where exactly the scarce skills are.
- Thus more research is necessary in some areas. The HSRC recommended, for example, that the list of scarce skills be refined and that research be conducted on the factors that hamper progression from graduate to post-graduate studies. This, too, is an important area of work which will guide the strategy on an ongoing basis, as will ongoing activities to monitor progress.
- The current list of scarce skills, which should guide internships, bursaries, workplace training and curriculum innovation, is contained in Section 3.3.5.

Strategic Goal 1: Increase the number of talented black South Africans attracted to the biodiversity sector.
(Focus: Schools & career guidance)

| Strategic Objectives | Associated Activities |
|---|---|
| <p>SO1: Promote the biodiversity sector among key decision-makers and all South Africans. Primary focus: Black South African school leavers, students and graduates.</p> | <ol style="list-style-type: none"> 1. Set up a Career Guidance reference group to develop a national environmental career guidance plan. 2. Develop a set of biodiversity careers resources (materials and interventions) and guidelines for their use. 3. Strengthen the biodiversity elements of existing careers programmes such as PACE. 4. Set up Biodiversity Clubs for high schools. 5. Provide more adequate and more targeted bursaries for post-graduate studies in particular, linked to a bursary support programme. |
| <p>SO4: Increase the relevance and quality of educational provisions by a wider range of HEIs and other training providers, in a manner that will improve pass rates and entry into post-graduate studies.</p> | <p>See Strategic Goal 2 for relevant activities.</p> |
| <p>SO5: Contribute to better science, mathematics, literacy and environmental learning in schools with adequate management capacity.</p> | <ol style="list-style-type: none"> 6. Lobby the Ministry of Basic Education to retain and strengthen biodiversity education in the national curriculum. 7. Inform textbook writers and publishers to improve biodiversity and environmental learning through new text books; influence the departmental criteria for selecting textbooks. 8. Support / replicate Science & Math schools such as LEAP and strengthen their biodiversity component. 9. Resource partners in teacher development to promote and improve science, mathematics, literacy and environmental learning through train-the-trainers courses and resources. 10. Support provincial environmental education forums and link to the Environmental Learning Forum (ELF). |

Strategic Goal 2: Improve the quality and relevance of skills produced for the sector.
Focus: Employees, training providers and organisations (HR)

| Strategic Objectives | Associated Activities |
|---|---|
| <p>SO2: Extend existing capacity: Improve the skills of those already in the workplace, and under-qualified or under-skilled, in a manner that contributes to social equity, a sense of belonging and pride in the sector.</p> | <ol style="list-style-type: none"> 11. Investigate the quality, relevance, scope of inter- and trans-disciplinary HE courses, to inform a possible new in-service Masters in Conservation Leadership. 12. Explore Learnerships for National Diploma holders. 13. Set up a pilot programme for workplace-based up-skilling in one or more parastatals or provincial conservation departments. |

| | |
|---|--|
| | <p>14. Extend existing bursaries that are insufficient to support mid-career Masters and PhD students, in priority fields, for full or part-time study.</p> <p>15. Fund more internships in priority fields in organisations with a proven capacity to mentor, support and advance inexperienced biodiversity practitioners, and support institutions starting up internship programmes.</p> |
| <p>SO4: Increase the relevance and quality of educational provisions by a wider range of HEIs and other training providers, in a manner that will improve pass rates and entry into post-graduate studies.</p> | <p>16. Resource HEs that have had some success in biodiversity related programmes, but lack adequate capacity or funds to address strategic needs, in a manner which will improve pass rates and entry into post-graduate studies e.g. fieldwork, curriculum revision, and research supervision.</p> <p>17. Convene an annual Skills Summit for training providers and employers to interact, and for the sector to engage the national funding and skills planning system.</p> <p>18. Develop a database of training providers and courses relevant to the environmental sector broadly, with a built-in peer review mechanism.</p> <p>19. Publish and promote educational guidelines to improve the quality of short courses and short course choices.</p> |
| <p>SO5: Contribute to better science, maths, literacy and environmental learning in schools with adequate management capacity.</p> | <p>See activities 5 – 9 above.</p> |
| <p>SO7: Increase the supply of scarce skills through targeted HE initiatives in priority areas identified through ongoing needs analyses.</p> | <p>20. Explore, and if relevant, support the establishment of a Centre of Excellence in Biodiversity Informatics with DST, SANBI and HEI partners.</p> <p>21. Explore and if relevant support the establishment of a Centre for Statistical Ecology, Demography & Biogeography with DST, SANBI and HEI partners.</p> <p>22. Develop resources to support the mainstreaming of biodiversity in general planning and environmental management courses.</p> <p>23. Investigate the best means to strengthen agricultural extension skills with a biodiversity component.</p> |

Strategic Goal 3: Improve the retention and effective deployment of suitable individuals in the sector.

Focus: Employees and organisations (HR)

| Strategic Objectives | Associated Activities |
|---|---|
| <p>SO2: Extend existing capacity: Improve the skills of those already in the workplace, and under-qualified or under-skilled, in a manner that contributes to social equity, a sense of belonging and pride in the sector.</p> | <p>See Goal 2 for relevant activities.</p> |
| <p>SO3: Improve retention and effective deployment of suitably skilled people in the sector through organisational design, skills planning, development and human resource development processes.</p> | <p>24. Convene, support and resource an Institutional Strengthening/HRD Network to strengthen biodiversity organisations' skills planning capacity through tangible initiatives including the following:</p> <ul style="list-style-type: none"> • 'Better practice' models for integrating racial diversity in organisations • 'Better practice' models for improving mentoring capacity • Tools for competency profiling and skills audits • Improved career paths including separate options for scientists and managers • Contemporary job titles and qualification requirements • Standardised occupational descriptions. |

Strategic Goal 4: Create enabling conditions for skills planning, development and evaluation for the sector as a whole.

Focus: Employees and national skills system

| Strategic Objectives | Associated Activities |
|--|---|
| <p>SO1: Promote the biodiversity sector among key decision-makers and all South Africans. Primary focus: Decision makers in the national skills system.</p> | <p>25. Position the environmental sector within the revised SETA landscape. 26. Lobby for the inclusion of biodiversity related skills needs in the NSDS III and HRDS. 27. Lobby for improved national statistics on biodiversity occupations.</p> |
| <p>SO6: Increase the impact of the collective effort of HCD initiatives relevant to the sector, through promotion, articulation and evaluation.</p> | <p>28. Develop and use a system to track BHCD programme beneficiaries from school and training to the workplace. 29. Evaluate the outcomes of the BHCD programme and communicate results. 30. Encourage wider and ongoing stakeholder participation in BHCD. 31. Coordinate and create synergy across BHCD activities. 32. Continue research to better understand causes of HCD issues and best interventions. 33. Use the annual Skills Summit to encourage evaluation, collaboration and collective action in the biodiversity sector.</p> |

CHAPTER SIX: MONITORING AND EVALUATION

This chapter provides guidelines for the formative monitoring and evaluation of the processes, outcomes and impact of the BHCD programme.

In most instances indicators are not confined to quantitative targets. These can have a detrimental effect on quality and impacts of initiatives. This is also in keeping with the BHCDs' focus on the *drivers* of skills improvement and transformation, rather than on the intended outcomes, narrowly defined.

An assessment of progress against indicators should be undertaken on a six monthly basis. At this time a review and refinement of indicators can also be considered.

A first full review of programme implementation and impact should be undertaken in the latter half of 2012, and repeated every five years. These reviews should be planned with a view to ongoing strategic development and the application of lessons learnt. It should be done through wide stakeholder involvement, and should take programme progress, as well as potentially changing contexts, into account. The review should include, for example, a consideration of the focus on race and gender based equity targets, the impact of this focus and the extent to which it still serves the interest of the sector and the country at that time.

For additional guidelines on monitoring and evaluation, see the HSRC report (Vass et al., 2009).

| Strategic Goal 1: Increase the number of talented black South Africans attracted to the biodiversity sector. | | |
|--|--|--|
| Strategic Indicator 1: An increase in the number of black South Africans applying for biodiversity-related studies & positions. | | |
| Strategic Objectives | Associated Activities | Indicators for Monitoring |
| SO1: Promote the biodiversity sector among key decision-makers and all South Africans. Primary focus: Black South African school leavers, students and graduates. | Set up a Career Guidance reference group to develop a national environmental career guidance plan. | A new national plan that addresses gaps and issues and provides guidelines for a national effort to attract Black South African school leavers, students and graduates to the biodiversity sector, has been produced and used. |
| | Develop a set of biodiversity careers resources (materials and opportunities) and guidelines for their use. | New biodiversity careers resources (materials and interventions) to attract Black South African school leavers, students and graduates to the biodiversity sector, and guidelines for their use, have been produced and used. |
| | Strengthen the biodiversity elements of existing careers programmes e.g. PACE. | The biodiversity elements of existing careers programmes such as PACE have been updated and strengthened. |
| | Set up Biodiversity Clubs for high schools. | Biodiversity clubs are promoting the biodiversity sector among Black South African school leavers as a sector with a strong vision of transformation and opportunities for fulfilling work that contribute to the national development agenda. |
| | Provide more adequate and more targeted bursaries for post-graduate studies in particular, linked to a bursary support programme. Include at least three post-graduate bursaries in HCD, and other scarce skill areas. | An increase in the availability and adequacy of bursaries and a support programme has contributed to increasing numbers of black South Africans applying for biodiversity-related studies and positions in both the natural and social sciences. This includes at least three bursaries in HCD per annum. |
| SO4: Increase the relevance and quality of educational provisions by a wider range of HEIs and other training providers, in a manner that improves pass rates and entry into post-graduate studies. | See Strategic Goal 2 for relevant activities. | <p>A growing range of South African HEIs offer learning programmes and short courses that are relevant and of an acceptable quality to the biodiversity sector. (Use HEMIS data.)</p> <p>There is an increase in the number of enrolments in biodiversity related post-graduate studies. (Use HEMIS data.)</p> |

| | | |
|--|---|--|
| SO5: Contribute to better science, mathematics, literacy and environmental learning in schools with adequate management capacity. | Lobby Ministry of Basic Education to retain and strengthen biodiversity education in the national curriculum. | Biodiversity related learning outcomes have been retained and/or strengthened in the national curriculum and syllabi. |
| | Inform textbook writers and publishers to improve biodiversity and environmental learning through new textbooks; influence the departmental criteria for selecting textbooks. | The biodiversity related content in the textbooks used across the grades and subjects by South African schools is strong. |
| | Support / replicate Science & Math schools such as LEAP and strengthen biodiversity component. | Biodiversity related learning outcomes in special Math and Science schools in South Africa are strong. |
| | Resource partners in teacher development to promote and improve science, mathematics, literacy and environmental learning through train-the-trainers courses and resources. | Resources and courses are used to promote and improve science, mathematics, literacy and environmental learning among student teachers and teachers from schools with adequate management capacity. |
| | Support provincial environmental education forums and link to the Environmental Learning Forum (ELF). | Through ELF provincial environmental education forums and biodiversity partners are equipped and supported to contribute to better science, mathematics, literacy and environmental learning in schools. |

| Strategic Goal 2: Improve the quality and relevance of skills produced for the sector. | | |
|--|---|---|
| Strategic Indicator 2: An improvement in the levels, quality and relevance of employee skills in the biodiversity sector. | | |
| Strategic Objectives | Associated Activities | Indicators for Monitoring and Evaluation |
| SO2: Extend existing capacity: Improve the skills of those already in the workplace, and under-qualified or under-skilled, in a manner that contributes to social equity, a sense of belonging and pride in the sector. | Investigate the quality, relevance, scope of inter- and trans-disciplinary HE courses, to inform a possible new in-service Masters in Conservation Leadership. | A report describes the quality, relevance and scope of inter- and trans-disciplinary courses, and makes recommendations regarding a new in-service Masters in Conservation Leadership. |
| | Explore learnerships for National Diploma holders. | A report evaluates the potential and feasibility of learnerships for National Diploma holders to improve the skills of under-qualified staff in a manner that contributes to social equity, a sense of belonging and pride in the sector. |
| | Set up a pilot programme for workplace-based up-skilling in one or more parastatals or provincial conservation departments. | One or more parastatals or provincial conservation departments have a new workplace-based up-skilling programme that improves staff skills in a manner that contributes to social equity, a sense of belonging and pride in the sector, and lessons learnt are available for further programme development in other agencies. |
| | Extend existing bursaries that are insufficient to support mid-career Masters and PhD students, in priority fields, for full- or part-time study. | An increase in availability and adequacy of bursaries supporting mid-career Masters and PhD students, in priority fields in a manner that contributes to equity, a sense of belonging and pride. (This will require a baseline survey of available bursaries.) |
| | Fund more internships in priority fields in organisations with a proven capacity to mentor, support and advance inexperienced biodiversity practitioners, and support institutions starting up internship programmes. | Internships in priority fields are being used to mentor, support and advance greater numbers of biodiversity staff in a manner that contributes to equity, a sense of belonging and pride. (This will require a baseline survey of available biodiversity internships.) |

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| <p>SO4: Increase the relevance and quality of educational provisions by a wider range of HEIs and other training providers, in a manner that will improve pass rates and entry into post-graduate studies.</p> | <p>Resource HEs that have had some success in biodiversity related programmes, but lack adequate capacity or funds to fully address strategic needs, e.g. fieldwork, curriculum revision, research supervision and post-doc ‘settling in’.</p> | <p>The capacity of a range of HEIs to fully address strategic needs regarding biodiversity tuition and research, as reported by these providers and their students, has been improved.</p> |
| | <p>Convene an annual Skills Summit for training providers and employers to interact, and for the sector to interact with the national funding and skills planning system including the DHET.</p> | <p>An annual Skills Summit has provided a platform for training providers and employers to interact towards increasing the relevance and quality of educational provisions in a wider range of HEIs and other training providers.</p> |
| | <p>Develop a database of training providers and courses relevant to the environmental sector broadly, with a built-in peer review mechanism.</p> | <p>A database of training providers and courses is being used by potential trainees, employers and providers towards increasing the quality and relevance of courses offered and chosen.</p> |
| | <p>Publish and promote educational guidelines to improve the quality of short courses and short course choices.</p> | <p>Training providers are using educational guidelines to improve the quality of short courses and short course choices.</p> |
| <p>SO5: Contribute to better science, maths, literacy and environmental learning in schools</p> | <p>See activities 5-9, Goal 1.</p> | <p>There is an improvement in the biodiversity-related learning outcomes of school leavers. (Use EMIS data and own surveys.)</p> |

| | | |
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| SO7: Increase the supply of scarce skills through targeted HE initiatives in priority areas identified through ongoing needs analyses. | Explore and if relevant support the establishment of a Centre of Excellence in Biodiversity Informatics with DST. | The recommendations from a report on the establishment of the Centre of Excellence in Biodiversity Informatics have been implemented. |
| | 34. Explore and if relevant support the establishment of a Centre for Statistical Ecology, Demography & Biogeography. | The recommendations from a report on the establishment of the Centre for Statistical Ecology, Demography & Biogeography have been implemented. |
| | 35. Develop resources to support the mainstreaming of biodiversity in general planning and environmental management courses. | Resources are being used to support the mainstreaming of biodiversity in general planning and environmental management courses. |
| | 36. Investigate the best means to strengthen agricultural extension skills with a biodiversity component. | The recommendations from a report on the best means to strengthen agricultural extension skills have been implemented. |

| Strategic Goal 3: Improve the retention and effective deployment of suitable individuals in the sector. | | |
|--|---|---|
| Strategic Indicator 3: Vacancy and turnover rates in the sector are reducing and skilled employees are being retained. | | |
| Strategic Objectives | Associated Activities | Indicators for Monitoring and Evaluation |
| SO2: Extend existing capacity: Improve the skills of those already in the workplace, and under-qualified or under-skilled, in a manner that contributes to social equity, a sense of belonging and pride in the sector. | See Goal 2 for relevant activities. | Vacancy and turnover rates in the sector are reducing and skilled employees are being retained. (Use Vulindlela and organisational data.) |
| SO3: Improve retention and effective deployment of suitably skilled people in the sector through organisational design, skills planning, development and human resource development processes. | Convene, support and resource an Institutional Strengthening/HRD Network to strengthen organisations' skills planning capacity through tangible initiatives including: | An Institutional Strengthening/HRD Network is active and participates in the development of tools to strengthen retention and effective deployment of staff in the sector. |
| | <ul style="list-style-type: none"> • 'Better practice' models for integrating racial diversity in organisations. | A range of biodiversity organisations pilot and share progressive models for integrating racial diversity. |
| | <ul style="list-style-type: none"> • 'Better practice' models for improving mentoring capacity. | A range of biodiversity organisations pilot and share models for improving mentoring capacity. |
| | <ul style="list-style-type: none"> • Tools for competency profiling and skills audits. | A range of biodiversity organisations pilot and share tools for doing competency profiling and skills audits. |
| | <ul style="list-style-type: none"> • Improved career paths including separate options for scientists and managers, contemporary job titles and qualification requirements. | Biodiversity organisations have developed new career paths including separate options for scientists and managers; brought job titles up to date, and revises qualification requirements. |

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|--|---|---|
| | <ul style="list-style-type: none"> Standardised occupational descriptions. | The recommendations of a report on standardising occupational descriptions in the sector are implemented. |
|--|---|---|

| Strategic Goal 4: Create enabling conditions for skills planning, development and evaluation for the sector as a whole. | | |
|--|---|---|
| Strategic Indicator 4: Nationally, the framework for biodiversity HCD planning, development and evaluation has improved. | | |
| Strategic Objectives | Associated Activities | Indicators for Monitoring and Evaluation |
| SO1: Promote the biodiversity sector among key decision-makers and all South Africans. Primary focus: Decision makers in the national skills system. | Position the environmental sector within the revised SETA landscape. | There is adequate provisioning for biodiversity related skills planning and development in the new national SETA system. |
| | Lobby for the inclusion of biodiversity related skills needs in the NSDS III and HRDS. | There is adequate provisioning for biodiversity related skills planning and development in the NSDS III and HRDS. |
| | Lobby for improved national statistics on biodiversity occupations. | National statistics on biodiversity occupations can be used to plan and monitor the impact of national skills development activities. |
| SO6: Increase the impact of the collective effort of HCD initiatives relevant to the sector, through promotion, articulation and evaluation. | Develop and use a system to track BHCD programme beneficiaries from school and training to the workplace. | A system to track BHCD programme beneficiaries is used to improve articulation, impact and evaluation. |
| | Evaluate the outcomes of the BHCD programme and communicate results. | The outcomes of the BHCD programme are evaluated and the lessons learnt are communicated to stakeholders. |
| | Encourage wider and ongoing stakeholder participation in the BHCD programme. | Stakeholder participation in the BHCD programme remains steady or increases over time. |
| | Coordinate and create synergy across the activities of the BHCD programme. | The activities of the BHCD programme are coordinated and strengthen each other. |

| | | |
|--|--|--|
| | Continue research to better understand causes of BHCD issues and best interventions. | HCD research is produced and used to inform the sector and plan best possible interventions. |
| | Use the annual Skills Summit to encourage evaluation, collaboration and collective action in the sector. | An annual Skills Summit leads to and/or supports collaboration and collective action. |

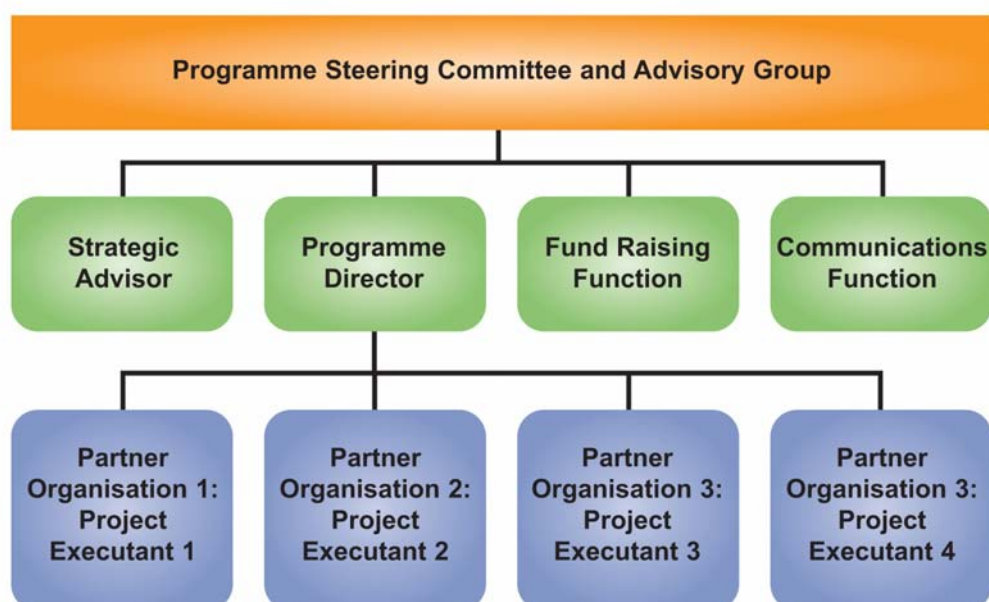
CHAPTER 7: IMPLEMENTATION ARCHITECTURE

The implementation architecture for the Biodiversity Human Capital Development (BHCD) Programme will be funded in the first three years (July 2010 to June 2013) by the Lewis Foundation, and housed by SANBI. In 2012 the core staffing for the programme will be taken over by SANBI, in accordance with SANBI's mandate from the DEA.

The implementation architecture aims to combine the benefit of ownership across the sector, with the benefit of a central coordinating mechanism that will be accountable for ensuring that the BHCD strategy is implemented and progress monitored and evaluated.

A core implementation team will consist of a Strategic Advisor, Director, Fundraising and Communications functions. This team will report via the Strategic Advisor to a Steering Committee consisting of representatives of the initiating partners, SANBI and the Lewis Foundation. The Committee and core team will be guided by an Advisory Group with relevant experts drawn from a range of organisations across the sector. The core team will work closely with a wider implementation team of project executants situated in a range of organisations in the sector. An organisation may implement more than one project through one or more project executants, as in the example (Figure 7.1). Roles are spelled out in more detail below.

Figure 7.1: Implementation Structure for the BHCD Programme



ADVISORY GROUP

The advisory group that has been advising the strategy development coordinator will be broadened and asked to advise the programme management steering committee and staff on strategic matters regarding the implementation and ongoing development of the BHCD programme, and to help promote the programme among partners. The advisory group will include experts from HR and national skills development contexts, conservation and research agencies and higher education. This group will not have executive powers. They will meet at least once a year for consultative purposes, and to comment on the progress of the programme, as reported by the core team.

PROGRAMME STEERING COMMITTEE

The steering committee will oversee the management and implementation of the BHCD programme. It will comprise two senior representatives each from SANBI and the Lewis Foundation. The steering committee will comment on the reports of the core team and advise them on strategic and general management matters. The steering committee should meet with the core team at least quarterly and during critical programme phases of the programme, on a monthly basis.

STRATEGIC ADVISOR

The strategic advisor is the former BHCD strategy development coordinator. Her task is to ensure that the research and stakeholder engagement undertaken during the development phase informs the strategy implementation, and to interpret the proposed activities, principles, objectives and vision of the strategy to the core team. She needs to assist with the conceptualisation and further development of project activities to achieve the strategic objectives, and to guide the development of communications and fundraising plans, as well as monitoring and evaluation measures. In the first years of implementation the programme director, fundraising and communications experts report to the strategy advisor. This role will be reduced over time and when appropriate, phased out.

PROGRAMME DIRECTOR

The programme director has the pivotal role of ensuring roll-out of the programme, communication and coordination between team members and partners, monitoring and evaluation, and the further development of new projects. The director is responsible for programme and financial management and will oversee the work of the project executants; project executants report to the director, who in turn reports to the strategic advisor. When the number of projects in the programme warrants this, a project manager may be appointed to assist the director. The director and other core staff will have administrative support from SANBI from the inception of the programme.

FUNDRAISING FUNCTION

This function is shared among all partners and personnel, including the strategic advisor and director, and project executants. A dedicated fund raiser will however be appointed with specific tasks including the development, implementation and coordination of a strategic funding plan which supports and is entirely aligned with the BHCD strategy; monitoring and reporting on fundraising activities and outcomes to the strategic advisor; and contributing to the fundraising capacity of organisations in the sector. The fundraising function must identify a range of potential national and international funding facilities and leverage funding off the significant initial contribution of the Lewis Foundation, to ensure a substantial investment in biodiversity skills development in South Africa.

COMMUNICATIONS FUNCTION

This function will also be shared among all programme partners and personnel. A dedicated communications person or agency will however be appointed with specific tasks including the development, implementation and coordination of a strategic marketing and communications plan which supports and is entirely aligned with the BHCD strategy, and the funding plan. The communications expert must also monitor and report to the strategic advisor on communication outputs. Communications should be approached as a mechanism for stakeholder engagement as well as promotion of the BHCD programme, and will probably involve a range of media (e.g. press, television, conferences, printed media, website and e-newsletters) to reach a range of stakeholder groups (from the youth to portfolio committees). A draft communications plan has been outlined and can be used as a starting point for further development.

PROJECT EXECUTANTS

These individuals are employees in a range of partner organisations (NPOs, universities, research institutes, conservation agencies, local government) across the sector. They may volunteer to participate in the BHCD programme in this way, or will be approached to participate. A project executant will be responsible for implementing one or more BHCD projects within the BHCD programme. One organisation (e.g. DEA) may be involved in more than one project, and may house more than one BHCD project executant. Executants will be responsible for the implementation, day to day general and financial management, as well as monitoring of their specific projects, which they may implement with colleagues within or outside the organisation. Where necessary, there will be a suitable financial arrangement with the partner organisations to ensure that executants dedicate adequate time to the HCD projects. Projects must fit the partner organisation's mission and mandate and will ideally benefit the partner directly. Project executants report to the programme director.

REFERENCE GROUPS

The following reference groups have been set up during stakeholder engagement, and can continue to act as forums for stakeholder consultation, participation and research:

- Higher Education Working Group
- Human Resource Development (HRD) Network
- Schools and Curriculum Task Team
- Career Guidance Forum
- National Environmental Skills Planning Forum.

CHAPTER 8: IMPLEMENTATION PLAN

In this chapter the activities listed in Chapters 5 and 6 by Strategic Objectives are re-organised according to their general focus. For example, activities that focus on career guidance, or lobbying, or student support, are grouped together. Criteria for evaluation (from Chapter 6) are added, along with an indication of a ballpark budget. These are indicative only and require further development.

Possible partners are also listed. In some cases, these partners are already involved or confirmed. In other cases, they need to be approached. Most partners who would eventually be involved, are not yet listed. The names listed are meant to provide a starting point for the programme implementers.

Time frames are important to note. Some activities have already started; some are urgent. All activities listed need to start in the 2010-2011 period, and to be well underway by 2012.

A first full review of programme implementation should be undertaken in the latter half of 2012, and repeated every five years. (See notes on Monitoring and Evaluation, Chapter 6.)

ACTIVITY SET 1: ANNUAL SKILLS SUMMIT, COORDINATION, EVALUATION AND STAKEHOLDER ENGAGEMENT

| Activity | Time frame | Criteria for Monitoring and Evaluation | Budget p.a. | Possible Partners |
|---|--|---|----------------------------------|---|
| Convene an annual Skills Summit for training providers and employers to interact, and for the sector to interact with the national funding and skills planning system. Use the Skills Summit to encourage evaluation, collaboration and collective action in the biodiversity sector. | Nov 2010 or Feb 2011 and then annually | An annual Skills Summit has provided a platform for training providers and employers to interact towards increasing the relevance and quality of educational provisions in a wider range of HEIs and other training providers. Annual Skills Summit leads to and/or supports collaboration and collective action. | Up to R200 000 per annual summit | National Environmental Skills Planning Forum, DEA ESSP team, DST Global Change Grand Challenge HCD team, Rhodes University HCD team |
| Coordinate and create synergy across BHCD activities. | Ongoing | The activities of the BHCD programme are coordinated and strengthen each other. | Up to R100 000 but combine | |
| Continue research to better understand causes of HCD issues and best interventions. | Ongoing; identify first needs in 2010 | HCD research is produced and used to inform the sector and plan best possible interventions. | Up to R100 000 per annum | Rhodes University ESSP team |
| Evaluate the outcomes of the BHCD programme and communicate results. | Start in 2011 | The outcomes of the BHCD programme are from time to time evaluated and the lessons learnt communicated to stakeholders. | Up to R100 000 | Rhodes University ESSP team |
| Encourage wider and ongoing stakeholder participation in BHCD. | Ongoing | Stakeholder participation in the HCD programme remains steady or increases over time. | Up to R100 000 but combine | |

ACTIVITY SET 2: LOBBYING AND ADVOCACY

| Activity | Time frame | Criteria for Monitoring and Evaluation | Budget p.a. | Possible Partners |
|---|--------------------------------|--|---------------|---|
| Lobby the Ministry of Basic Education to retain and strengthen biodiversity education in the national curriculum (SG1, SO5). | Immediate and ongoing in 2010 | Biodiversity related learning outcomes have been retained and/or strengthened in the national curriculum and syllabi. | Up to R10 000 | DEA and National Curriculum Working Group |
| Inform textbook writers and publishers to improve biodiversity and environmental learning through new text books; influence the departmental criteria for selecting textbooks (SG1, SO5). | Following on above and ongoing | The biodiversity related content in the textbooks used across the grades and subjects by South African schools is strong. | Up to R10 000 | DEA and National Curriculum Working Group |
| Position the environmental sector within the revised SETA landscape. | Immediate and urgent | There is adequate provisioning for biodiversity related skills planning and development in the new national SETA system. | Up to R10 000 | DEA, National Environmental Skills Planning Forum |
| Lobby for the inclusion of biodiversity related skills needs in the NSDS III and HRDS. | Immediate and urgent | There is adequate provisioning for biodiversity related skills planning and development in the NSDS III and HRDS. | Up to R10 000 | DEA, National Environmental Skills Planning Forum |
| Lobby for improved national statistics on biodiversity occupations. | 2010-2011 | National statistics on biodiversity occupations can be used to plan and monitor the impact of skills development activities. | Up to R10 000 | DEA, National Environmental Skills Planning Forum |

ACTIVITY SET 3: CAREER AND STUDY GUIDANCE: SCHOOLS, UNIVERSITIES AND OTHER SITES

| Activity | Time frame | Criteria for Monitoring and Evaluation | Budget p.a. | Possible Partners |
|--|-----------------|--|--------------------|--|
| Set up a Career Guidance reference group to develop a national environmental career guidance plan (SG1, SO1). | Aug - Sept 2010 | A new national plan that addresses gaps and issues and provides guidelines for a national effort to attract Black South African school leavers, students and graduates to the biodiversity sector, has been produced and used. | Up to R10 000 | DEA, WWF |
| Develop a set of biodiversity careers resources (materials and opportunities) and guidelines for their use (SG1, SO1). | Sept - Oct 2010 | New biodiversity careers resources (materials and interventions) to attract Black South African school leavers, students and graduates to the biodiversity sector, and guidelines for their use, have been produced and used. | Up to R50 000 | SANBI, DEA and the Career Guidance Forum |
| Strengthen the biodiversity elements of existing careers programmes e.g. PACE (SG1, SO1). | Sept -Oct 2010 | The biodiversity elements of existing careers programmes such as PACE have been updated and strengthened. | Up to R10 000 | |
| Set up Biodiversity Clubs for high schools (SG1, SO1; also SG1, SO5). | By January 2012 | Biodiversity clubs are promoting the biodiversity sector among Black South African school leavers as a sector with a strong vision of transformation and opportunities for fulfilling work that contribute to the national development agenda. | R500 000 per annum | WWF, SANBI, WESSA, EWT |

ACTIVITY SET 4: WORKING WITH SCHOLARS, SCHOOLS AND SCHOOLS' PARTNERS

| Activity | Time frame | Criteria for Monitoring and Evaluation | Budget p.a. | Possible Partners |
|---|------------|--|--------------------------|--|
| Support / replicate Science and Math schools such as LEAP and strengthen biodiversity component. | 2011 | Biodiversity related learning outcomes in special Math and Science schools in South Africa are strong. | Up to R10 000 | DEA and National Curriculum Working Group |
| Resource partners in teacher development to promote and improve science, mathematics, literacy and environmental learning through train-the-trainers courses and resources. | 2010-2011 | Resources and courses are used to promote and improve science, mathematics, literacy and environmental learning among student teachers and teachers from schools with adequate management capacity. | Up to R100 000 | DEA, DHET, WESSA, Delta Education Centre, SAEON and others |
| Support provincial environmental education forums and link to the Environmental Learning Forum (ELF). | | Through ELF provincial environmental education forums and biodiversity partners are equipped and supported to contribute to better science, mathematics, literacy and environmental learning in schools. | Up to R200 000 per annum | DEA, WESSA, SAEON, provincial conservation agencies and others |

ACTIVITY SET 5: WORKING WITH STUDENTS AND UNIVERSITIES

| Activity | Time frame | Criteria for Monitoring and Evaluation | Budget p.a. | Possible Partners |
|---|-----------------------------------|--|--|---|
| Provide more, more adequate and more targeted bursaries for post-graduate studies in particular, linked to a bursary support programme. Include at least three post-graduate bursaries in HCD, and other scarce skill areas (SG1, SO1). | By Sept 2011 | An increase in the availability and adequacy of bursaries and a support programme has contributed to increasing numbers of black South Africans applying for biodiversity-related studies and positions. | R1 million: R20 000 per student per annum; R500 000 bursar support programme | NRF, DHET, DST Global Change Grand Challenge, international donors |
| Investigate the quality, relevance, scope of inter- and trans-disciplinary HE courses, to inform a possible new in-service Masters in Conservation Leadership. | 2010-2011 | A report describes the quality, relevance and scope of inter- and trans-disciplinary courses, and makes recommendations regarding a new in-service Masters in Conservation Leadership. | Up to R50 000 | Higher Education Working Group |
| Explore learnerships for National Diploma holders. | 2011-2012 | Learnerships for National Diploma holders improve the skills of under-qualified staff in a manner that contributes to social equity, a sense of belonging and pride in the sector. | Up to R1 million | DEA, WESSA, SANBI, SETA |
| Extend existing bursaries that are insufficient to support mid-career Masters and PhD students, in priority fields, for full- or part-time study. | Priority in 2010 and then ongoing | An increase in availability and adequacy of bursaries supporting mid-career Masters and PhD students, in priority fields in a manner that contributes to equity, a sense of belonging and pride. | Up to R1 million; 3 x R20 000 per PhD bursary | NRF, universities, DHET, DST |
| Resource HEIs that have had success in biodiversity related programmes, but lack adequate capacity or funds to fully address strategic needs, e.g. fieldwork, curriculum revision, research supervision and post-doc 'settling in'. | 2011 | The capacity of a range of HEIs to address strategic needs regarding biodiversity teaching and research, as reported by these providers and their students, has been improved. | Up to R500 000 per intervention | University of Fort Hare, University of the North, universities of technology and others |

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| Explore and if relevant support the establishment of a Centre of Excellence in Biodiversity Informatics with DST. | 2010-2012 including 2010 BIMF meeting | The recommendations from a report on the establishment of the Centre of Excellence in Biodiversity Informatics have been implemented. | Up to R10 000 | SANBI, UKZN, DST |
| Explore and if relevant support the establishment of a Centre for Statistical Ecology, Demography & Biogeography. | 2010-2012 | The recommendations from a report on the establishment of the Centre for Statistical Ecology, Demography & Biogeography have been implemented. | Up to R10 000 | SANBI, UCT, DST |
| Develop resources to support the mainstreaming of biodiversity in general planning and environmental management courses. | 2010-2012 | Resources are being used to support the mainstreaming of biodiversity in general planning and environmental management courses. | Up to R100 000 for materials production | SANBI, IAIA SA, universities and municipalities |
| Investigate the best means to strengthen agricultural extension skills with a biodiversity component. | 2010-2012 | The recommendations from a report on the best means to strengthen agricultural extension skills have been implemented. | Up to R500 000 for report and implementation | WWF, SANBI, University of Stellenbosch |

ACTIVITY SET 6: WORKING WITH EMPLOYERS

| Activity | Time frame | Criteria for Monitoring and Evaluation | Budget p.a. | Possible Partners |
|---|---|--|---|--|
| Set up a pilot programme for workplace-based up-skilling in one or more parastatals or provincial conservation departments. | 2011 | One or more organisations have a new workplace-based up-skilling programme that improves staff skills in a manner that contributes to social equity, a sense of belonging and pride in the sector. | Up to R200 000 per programme; one programme per annum | Parastatals, provincial departments, universities |
| Fund more internships in priority fields in organisations with a proven capacity to mentor and advance inexperienced biodiversity practitioners, and support institutions starting internships. | Priority in 2010 and then ongoing | Internships in priority fields are being used to mentor, support and advance greater numbers of biodiversity staff in a manner that contributes to equity, a sense of belonging and pride. | Up to R1 million | SANBI, Mondi Wetlands Programme, SANCCOB, SANParks, Ezemvelo KZN Wildlife |
| Develop a database of training providers and courses relevant to the environmental sector broadly, with a built-in peer review mechanism. | 2010-2011 | A database of training providers and courses is being used by potential trainees, employers and providers towards increasing the quality and relevance of courses offered and chosen. | Up to R50 000 to develop platform | Rhodes University, WESSA |
| Publish and promote educational guidelines to improve the quality of short courses and short course choices. | 2011 | Training providers are using educational guidelines to improve the quality of short courses and short course choices. | Up to R50 000 to develop, publish and promote | Rhodes University, WESSA |
| Convene, support and resource an Institutional Strengthening/HRD Network to strengthen organisations' skills planning capacity through tangible initiatives including: | The Network has been initiated and needs to be ongoing. | An Institutional Strengthening/HRD Network is active and participates in the production of a set of tools to strengthen retention and effective deployment of staff in the sector. | Up to R150 000 per annum | DEA, ELF, WESSA, SANBI, SANParks, provincial agencies and other members of HRD Network |

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| <ul style="list-style-type: none"> • 'Better practice' models for integrating racial diversity in organisations. | | A range of biodiversity organisations pilot and share progressive models for integrating racial diversity. | Up to R50 000 per annum | As above, with expert input |
| <ul style="list-style-type: none"> • 'Better practice' models for improving mentoring capacity. | | A range of biodiversity organisations pilot and share models for improving mentoring capacity. | Up to R100 000 per annum | DEA, ELF, WESSA, SANBI, SANParks, provincial agencies and other members of HRD Network |
| <ul style="list-style-type: none"> • Tools for competency profiling and skills audits. | | A range of biodiversity organisations pilot and share tools for doing competency profiling and skills audits. | Up to R50 000 per annum | As above, with expert input |
| <ul style="list-style-type: none"> • Improved career paths including separate options for scientists and managers, contemporary job titles and qualification requirements. | | A range of biodiversity organisations develop and share new career paths; bring job titles up to date, and revise qualification requirements. | Up to R50 000 per annum | As above, with expert input |
| <ul style="list-style-type: none"> • Standardised occupational descriptions. | | The recommendations of a report on standardising occupational descriptions in the sector are implemented. | Up to R50 000 once off | DEA, ELF, WESSA, SANBI, SANParks, provincial agencies and other members of HRD Network |

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| Ballpark Budget Summary: | | | | |
| Cost of implementation projects | R7 350 000 | per annum | (if all projects are implemented according to above ballpark figures) | |
| Core staff and project executants | R3 246 143 | Year 1 | (includes contribution to Skills Summit and some project start up funding) | |
| | | | (core budget reduces to R2,8 million and R2,4 million in years 2 and 3) | |

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