



science and technology

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## Foundational Biodiversity Information Programme

DST/KFD/SANBI

Framework Document

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## **1. PROGRAMME TITLE AND DESCRIPTION**

### **1.1 Title of the Programme**

Foundational Biodiversity Information Programme

### **1.2 Description of Programme**

RATIONALE: South Africa is one of the world's "megadiverse countries" which means that it is especially rich in terms of biodiversity. This wealth of biodiversity underpins a large proportion of the economy and many urban and rural people are directly dependent on it for their livelihoods, jobs, food, shelter, medicines and spiritual well-being. Sustainable use and management of South Africa's biodiversity requires a solid knowledge base and access to relevant information and data.

Researchers in South Africa have made considerable progress towards documenting our biodiversity, but large gaps in our knowledge still exist and it has been estimated that more than 50,000 species remain undiscovered or un-described. These species may have economic benefits or they could play a critical role in the functioning of ecosystems. There are also several parts of South Africa in which the biodiversity has been only superficially explored and so data critical for development planning and ecosystem management are poor. The distribution and abundance of most species in South Africa is also far from complete, even for the better known groups including plants, small mammals, reptiles and amphibians, which makes understanding change in status and sustainable use problematic. The scale of the effort required to fill all gaps means that this will not be achievable within a reasonable time frame, and so a strategic approach is critical to ensure that priorities are addressed. For the knowledge that has been and continues to be generated, there is generally poor co-ordination and it is not all readily accessible to stakeholders who currently or potentially need it. A new, long-term programme has been developed to address these challenges.

The primary focus of the programme is to generate, co-ordinate and make accessible knowledge relevant to "essential biodiversity variables" which include species occurrence, species identity, population abundance, and phylogenetic / DNA information, including barcoding. This type of information is often referred to as "fundamental" or "foundational" because it forms the basis of so many other aspects of biodiversity research and decision-making. These data sets are critical for ecosystem mapping, monitoring and reporting on the state of biodiversity, for sustainable use of biodiversity, and for understanding and mitigating the impacts of global change on biodiversity and the programme priorities lie in these areas of activity.

While "foundational biodiversity knowledge" plays an essential role in facilitating understanding of ecosystem services and goods, its link to sustainable use of biodiversity for societal benefits and policy input is indirect. This often makes its relevance less attractive compared to other more exciting areas of research where the outputs can directly feed into societal benefits or policy. In addition, this aspect of research often deals with descriptive science and is therefore not perceived as cutting-edge. An additional challenge is that researchers who generate the information on essential biodiversity variables, and those practitioners who use this type of information in research or decision-making generally work in isolation from each other, resulting in misalignment in what knowledge is generated and what is needed and used. The uptake of the outputs of

this foundational science by practitioners further up the value chain and closer to the science-society and science-policy interfaces is rather low due to these blockages.

The FBIP requires that funded projects align knowledge generation or data mobilization with the needs of knowledge users higher up the value chain. Having a long term programme will ensure information security and incremental knowledge generation which is not the current situation.

AIM: The aim of the Foundational Biodiversity Information Programme (FBIP) is to fund the generation, mobilization and integration of priority foundational biodiversity knowledge and information so that this can be managed, secured and disseminated to address the needs of society, the Department of Science & Technology (DST) Global Change Programme and the bio-economy.

ADDED VALUE: The DST indicated that an integrated programme that covers previously funded programmes such as the South African Biodiversity Information Facility (SABIF) and the South African Biosystematics Initiative (SABI) and those that are strategic but unfunded (South African Barcode of Life and South African Encyclopedia of Life) would not only reduce transaction costs but would benefit from stronger collaboration and increase the impact of the investment.

## **2. EXECUTIVE SUMMARY**

The FBIP addresses the generation, mobilization and integration of foundational biodiversity knowledge and information so that it can be managed and disseminated for addressing societal needs. The Programme is fully aligned to international and national obligations and objectives including the Convention on Biological Diversity (CBD), the Intergovernmental Platform on Biodiversity & Ecosystem services (IPBES), National Biodiversity Act, the National Biodiversity Strategy & Action Plan, the Global Change and Bio-economy Grand Challenges of DST and its programme on Indigenous Knowledge Systems. The Programme integrates SABIF, SABI, DNA barcoding as promoted by the International Barcode of Life (IBOL), and the compilation of species information in line with the Encyclopedia of Life (EoL). The main approach of the FBIP is to fund large, collaborative / integrated team projects which align with knowledge needs, or which involve participants along the entire value chain from knowledge generation to application for decision-making. These projects will also include postgraduate students and emerging researchers, and the up-skilling of researchers and practitioners who use the data generated. The projects will generate or mobilize species occurrence data, DNA barcode data, and descriptive information on species, and will ensure that the knowledge is co-ordinated, managed and disseminated through appropriate structures and systems. Monitoring of the uptake and impact of the knowledge generated will allow the development of an understanding of best practice for ensuring that research outputs do have an impact on global change understanding and decision-making relating to biodiversity and sustainable livelihoods. A limited number of small grants will also be available to address key strategic gaps in data / knowledge. This framework is applicable for a three-year period, and it is anticipated that it will be revised every fourth year.

### **3. STRATEGIC CONTEXT**

#### **3.1 Environmental scan**

The Programme will deliver products that contribute to the fulfilment of objectives included in the Aichi Targets of the Strategy of the Convention on Biological Diversity (CBD) for 2011-2020, the Global Taxonomic Initiative of the CBD, the National Biodiversity Act, National Biodiversity Framework, the Global Change and Bio-economy Grand Challenges of DST and its programme on Indigenous Knowledge Systems. The outputs of the Programme are foundational to protecting South Africa's ecological infrastructure on which many industries and communities depend for their livelihood and to supporting the sustainable use of components of biodiversity.

Several workshops involving DST, NRF, SANBI and representatives of programmes such as SABI, SABIF, EoL and SABL were held in 2011 and 2012 to discuss the DST request for an integrated programme which would reduce transaction costs of separate programmes and increase impacts. This group formed a task team which developed the Programme concept. In October 2012 a brain-storming session was held for the users of foundational biodiversity information in other programmes or in decision-making to identify priority needs. Two workshops were run for potential participants / contributors to the Programme to discuss the approach, and the Programme concept was discussed by both the SABI and the SABIF Steering Committees, and well as at the SABI Forum in 2012. A National Strategy for Biosystematics Research in South Africa has been developed by SANBI, and this identifies priority outputs. A workshop at the Southern African Society for Systematic Biology (SASSB) in July 2012 discussed these priorities and some of the constraints on researchers in the field.

#### **3.2 Objectives**

The Programme has four main strategic objectives which deal with the generation of knowledge, the mobilization of information, integration of data, ensuring the management and dissemination of knowledge and data, capacity development and development of an understanding of how best to ensure the uptake and application of outputs in foundational biodiversity knowledge.

Strategic Objective 1: Generate knowledge and mobilise existing data to address priority knowledge / information gaps identified through consultation with or involvement of relevant stakeholders who use and apply foundational biodiversity information in decision-making for sustainable use and development (Figure 1).

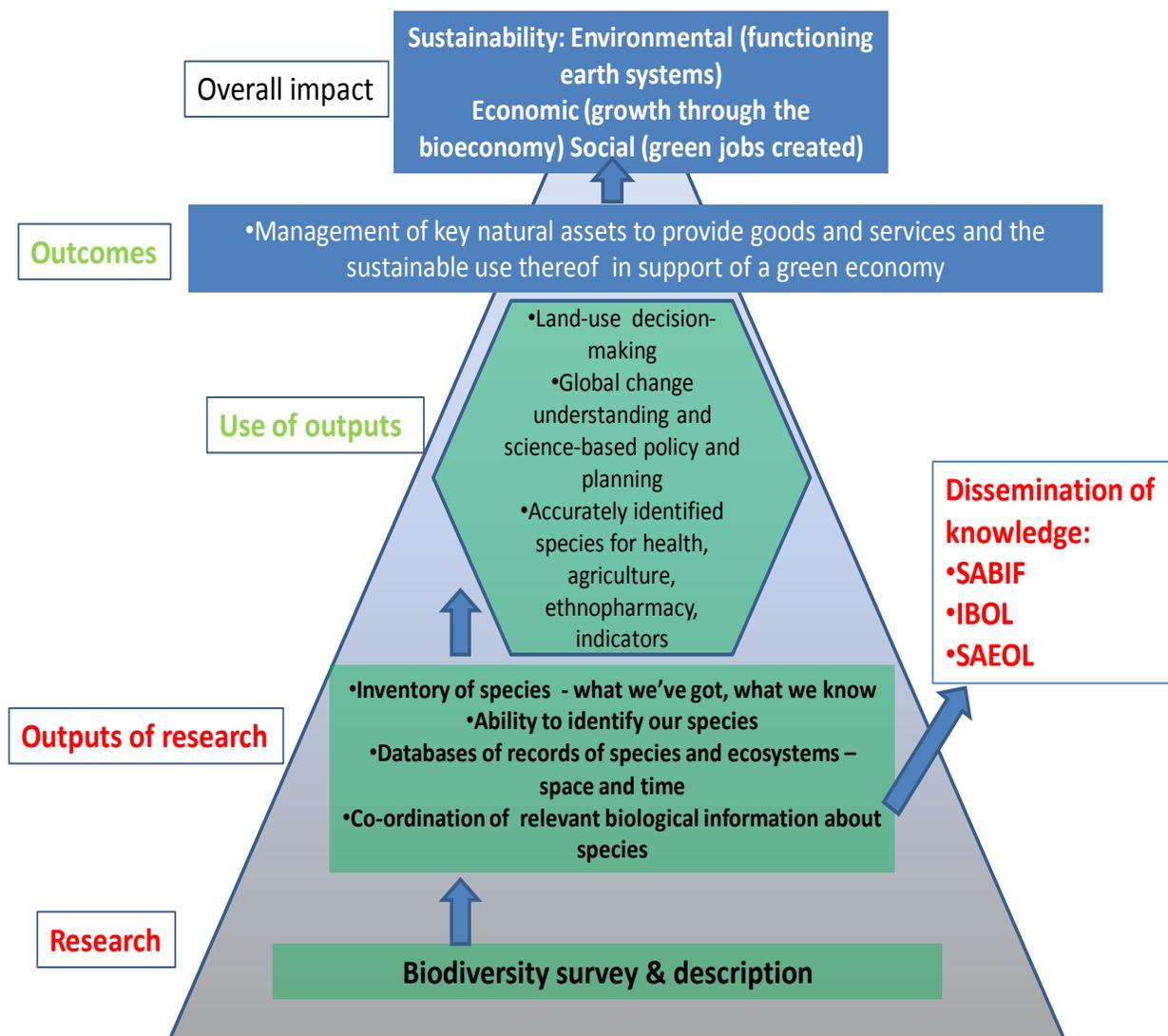
Knowledge generation includes:

- discovery, description, and identification of taxa,
- surveys of areas or taxa of strategic importance for presence / absence (species occurrence) and / or population abundance data,
- phylogenetic and population genetic diversity, including DNA barcodes, which enable the distinction and identification of taxa

Mobilization of existing data includes:

- data capture / digitization of specimen data according to the Darwin core standard for biodiversity collections
- compilation of species information according to the FBIP / EoL requirements.

Publications for the scientific literature will also be generated, and data sets will be handed over to the FBIP / SANBI for long-term archiving, dissemination, integration and application as detailed in Strategic Objective 2.



**Figure 1:** Framework for aligning knowledge generation and data mobilization with needs of users in the field of global change and the bio-economy. Red text = components of the value chain that will be funded Green text = components of value chain that must inform the focus of the foundational biodiversity knowledge generation and dissemination that is funded.

Strategic Objective 2. Contribute content to an integrated information management and dissemination system to provide long-term access to outputs from the FBIP.

The main content outputs from the FBIP for management and dissemination include:

- A national inventory / checklist of all South African species, which is updated according to the latest research findings.
- Co-ordinated species pages for South African species including photographs / illustrations, information on biology, ecological role and interactions, links to DNA barcode / sequence data, distribution maps, indigenous knowledge, existing and potential use, threat status, population trends and literature through the Biodiversity Heritage Library.
- Primary data sets (species occurrence) which include specimen identity, date of collection, locality of collection, collector details, origin of record and where possible other data such as habitat description, biological notes, abundance, in accordance with the Darwin Core standard.
- Peer-reviewed, scientific publications relating to foundational biodiversity knowledge and information (these are used to provide content or update other outputs).

Strategic Objective 3: To attract, develop and up skill people to ensure appropriate capacity for biodiversity knowledge generation, dissemination and application. This includes:

- Training of postgraduate students in the generation, management, dissemination and application of foundational biodiversity knowledge.
- Development of capacity for application / use of the knowledge / data amongst practitioners.
- Provision of opportunities for emerging researchers.
- Training of researchers / data managers who work with foundational biodiversity information in capture and management of data.
- Training of researchers in novel approaches to identifying biological material

Strategic Objective 4: To develop an understanding of best practices for ensuring that foundational biodiversity knowledge generated and disseminated is taken up for use and application in decision-making and sustainable use (bio-economy) by

testing different approaches to project development and implementation and monitoring and measuring uptake and impact of each approach.

### **3.3 NRF perspective**

The NRF vision seeks to create:

- World-class research,
- A transformed society, and
- A sustainable environment.

The Programme will contribute to addressing all three of these items. The integrated approach being proposed is innovative and publication of the research outputs in formal scientific literature is one of the Programme outputs. The approach is also transformatory in that it addresses the traditional individualistic and self-serving approach of researchers, and the Programme recognises the need to include the development of previously disadvantaged people, whether these are students, scientists or communities. The work of the Programme is foundational to a sustainable environment.

The Programme aligns with the following strategic objectives of the NRF:

- Promote competitive research as the basis for the knowledge economy
- Grow a representative workforce in South Africa.

The Programme will deliver products that contribute to the fulfilment of objectives included in the Aichi Targets of the Strategy of the Convention on Biological Diversity for 2011-2020, the Global Taxonomic Initiative of the CBD, the National Biodiversity Act, National Biodiversity Framework, the Global Change and Bio-economy Grand Challenges of DST and its programme on Indigenous Knowledge Systems.

### **3.4 Institutional structure**

SANBI manages the implementation of the Programme, and the NRF, through the Global Change Programme and the Grants Management and Systems Administration (GMSA), manages the project proposal review and grant allocation process.

The Programme Manager and Co-ordinator are based at SANBI and work with the NRF GMSA team and the Global Change Programme Director to ensure that the strategic objectives of the Programme are met through the grants, and to meet both financial and performance reporting requirements of the DST.

The GMSA's role is to establish (with input from the Programme Manager and Co-ordinator) and distribute the proposal submission and review process for grant applications, to distribute allocated grants, and to track and report to the Programme Co-ordinator (SANBI) and the Global Change Programme Director (NRF) on allocation to and expenditure by grantholders.

### 3.5 Financing support

The Programme is funded by the DST through the Global Change Programme. SANBI provides in-kind co-funding in terms of the salary of the Programme Manager, and the salaries of other staff who will be involved in aspects of data management and dissemination, provision of office space and associated facilities, and access to IT infrastructure.

### 3.6 Key stakeholders

The key stakeholders include:

- Academics and researchers at higher education institutions, government departments, science councils and parastatals, museums, herbaria and other natural science collection facilities. Role: generation of knowledge and use and application of knowledge and data.
- Decision-makers, including spatial planners and policy developers in municipal, provincial and national government and institutions such as SANBI. Role: identification of gaps and knowledge needs, application of knowledge generated for science-based policy and decision-making and planning.
- Civil society and communities. Role: contribute as citizen scientists to generation of knowledge; users of knowledge.
- Private sector industry: users of knowledge and data for planning and for unlocking economic opportunities.
- Consultants (environmental impact assessment consultants). Role: contributors of information and users of knowledge.

### 3.7 Risks/barriers

#### 3.7.1 Current barriers to achieve the stated objectives

While “Foundational Biodiversity Knowledge” plays an essential role in facilitating understanding of ecosystem services and goods, its link to sustainable use of biodiversity for societal benefits and policy input is indirect. This often makes its relevance less attractive compared to other more exciting areas of research where the outputs can directly feed into societal benefits or policy. In addition, this aspect of research often deals with descriptive science and is therefore not perceived as cutting-edge.

An additional challenge is that researchers who generate the information on essential biodiversity variables, and those practitioners who use this type of information in research or decision-making generally work in isolation from each other, resulting in misalignment in what knowledge is generated and what is needed and used. The uptake of the outputs of this foundational science by practitioners further up the value chain and closer to the science-society and science-policy interfaces is rather low due to these blockages.

Traditionally there has been little alignment between priorities and focus areas, which reduces the impact of the outputs, and there is also duplication of effort, loss of data and little synergy in shared expertise across projects. There are also many uncoordinated mechanisms for storing and disseminating the knowledge and data generated and no generally accepted

means of ensuring long-term security and broad, open access.

### **3.7.2 Risks to Programme achieving its objectives and proposed measures to address risks**

#### **Insufficient participation**

There are approximately 200 taxonomists who are responsible for generating the type of knowledge that is the focus of the Programme. This is a fairly substantial capacity base but there is a risk that insufficient individuals will be willing to participate in a programme that requires extensive collaboration and team work, and that has an untraditional approach, deliverables and scope.

This risk must be addressed through a communications strategy to promote the Programme and highlight the outputs and their impacts. A regular forum is a mechanism to generate interest in participation. These communication activities will be the responsibility of the Programme staff.

#### **Negative impact on the discipline of taxonomy**

The need for ring-fenced funding for taxonomy, because of its importance to other biodiversity-related disciplines, and the decline in capacity and outputs was recognised by the DST in 2002 and was the rationale for the establishment of SABI.

The FBIP funds a limited number of projects and while these involve large teams of researchers, it is likely that some researchers will not be able to align their expertise within any of the funded projects. The work that they do may be highly relevant and of high quality, and without access to funding, the research could collapse. In order to address this risk, limited funds will be allocated for strategic interventions. The extent of this funding must, however, remain capped to ensure that the bulk of the research funding is directed towards achieving the strategic objectives. There are also other funding streams through the NRF that taxonomists can access.

#### **Loss of focus**

There is a risk that funding applications to the NRF will be referred to the FBIP even if they fall outside its scope. There is also a risk that funds become diverted to activities higher up the value chain at the expense of the foundational knowledge generation, or that projects funded do not produce the outputs required by the FBIP. This will need to be monitored by the Programme Manager and Co-ordinator, and the scoring criteria for proposal assessment will need to ensure that FBIP objectives are addressed.

#### **Lack of delivery of data / knowledge outputs by grantholders**

While SABIF required that funded projects deliver the data mobilized to SANBI, NRF-funded research does not have this requirement. This means that there could be low levels of delivery of data, either because researchers

are reluctant to share data, or the data may not be in an appropriate form to enable its integration and application, or there may simply be a lack of delivery on the outputs stated in the project proposals. Approaches to address these risks include the development of guidelines for delivery of data outputs, the ineligibility of grantholders who have not delivered data for future grants, and training to ensure that data standards are met.

## 4. MODUS OPERANDI

### 4.1 Funding approaches

There are two different funding approaches in the Programme:

- Large, integrated team projects: two- step process managed through the NRF , i. Concept document call, evaluation and selection for full development (2-4 concepts selected); ii. Development of full proposals for selected concept documents, evaluation, selection of 1 to 2 full proposals for funding for a three-year period.
- Small grants: managed through the NRF to address key strategic gaps in information and knowledge. A call will be distributed for applications annually and projects will usually be funded for one year only. Depending on funding cycles and availability, two year grants may also be made but this will be specified in the call.

### 4.2 Call for proposals

- Large, integrated team projects: A call for concept notes opens during the year. All endorsed concept note applications must be submitted electronically via the NRF's Submission system at <https://nrfsubmission.nrf.ac.za>. Concept notes will be assessed by a panel and a limited number (usually 2-4) will be selected for further development into full proposals. There will not be an open call for full proposals.
- Small grants: A call for small grants opens during the year. All applications must be submitted electronically via the NRF's Submission system at <https://nrfsubmission.nrf.ac.za>.
- All applications **must** be endorsed by the research office of the principal applicant before submission to the NRF. It is the responsibility of each applicant to familiarise themselves with the internal closing date, set by their institution in order to meet the NRF closing date. Incomplete OR late submissions will not be accepted.
- At each phase of the large, integrated team projects (concept note and full proposal) and for small grants, applicants must ensure that their Curriculum Vitae are updated on the NRF Submission system.
- All outputs that were entered by researchers on the NRF Online system were migrated to the NRF Submission system. When logging on to the NRF Submission system, researchers are requested to verify their outputs on the Landing Page by selecting the type of output under the heading "To be Reviewed" and verifying each output individually until there are none left to be reviewed.

#### **4.2.1 Programme focus areas**

##### **Large, integrated team projects:**

Projects falling within the following focus areas have been identified for support in 2016/17:

1. Resolution of taxonomic problems, and documenting distribution and abundance of plant and animal species used for medicinal purposes in South Africa.
2. Biological control: identification of potential biocontrol agents through being able to identify the pest / pathogen / alien and its origin, the identification of natural predators / pathogens of it, and close relatives of the host and potential agents.
3. Coordinated surveys for soil organisms and identification of functional roles in agri-ecosystems and natural areas and the co-ordination of existing information on soil organisms in South Africa.
4. Biodiversity functionality. Better understanding of key functional attributes of different species in ecosystems, and the key interactions between them, focusing on terrestrial regulatory services systems (developing an understanding of the system using a functional approach). Regulatory services include invasion resistance, pollination, climate regulation, carbon sequestration, pest and disease control in agricultural systems.
5. Multi-taxa surveys of strategic geographic areas (eg. new or proposed protected areas, areas targeted for development, areas with high levels of dependence on biodiversity for livelihoods, areas of importance for providing ecological infrastructure) that produce inventories, integrated information for species recorded (species pages, DNA barcodes, species occurrence and abundance data). Mobilization of existing records for the species recorded or for the area could also be included in the project.

##### **Small strategic grants:**

These will be called for on an annual basis. The criteria are:

- The strategic value of the data or knowledge that will be generated / made accessible through the grant must be clearly explained and motivated (what will change because the knowledge is generated / data made available?).
- The data / knowledge should be clearly and directly linked to the main focus of the Programme (bio-economy and global change), but it may fall outside of the five focus areas listed above.
- Grants can be used for taxonomic research, mobilisation of primary data (specimen records), generation of DNA barcodes, compiling species information or for data management / dissemination innovations.
- The grants must result in the release of the data to the FBIP / SANBI for archiving, integration, management and dissemination.

#### 4.2.2 Applicant eligibility

- Researchers working towards the generation and mobilization of foundational biodiversity knowledge are the priority target group for accessing programme funding.
- Applicants (i.e. the Principle investigator) must be either:
  - full-time researchers based at NRF recognised research institutions<sup>1</sup> in South Africa.

OR

- part-time researchers on contract at NRF recognised research institutions<sup>1</sup> in South Africa, on condition that the appointment is for (at least) the duration of the project applied for in the submission. The length of the contract should be stated on the application form. Salaries must be paid by the research institution and the primary employment of the individual concerned must be at that institution.

OR

- retired researchers affiliated to an NRF recognised research institution<sup>1</sup> provided that institutional support is evident in the form of an employment contract, office space, administrative support, access to research equipment and space. The institution will have to ensure that a minimum of six months are spent at the facility for the purpose of research and research capacity development. The researchers must have a research publication track record and must be actively supervising postgraduate students at present.

- Large, integrated team projects: Post-doctoral fellows, students, technical and support staff are NOT eligible to apply.
- Small grants: Post-doctoral fellows and students are NOT eligible to apply.

#### 4.2.3 Research team structure and rules of participation

Only researchers based at NRF recognised research institutions<sup>1</sup> in South Africa are eligible to apply as a principal investigator (4.2.2). Co-investigators, research associates and collaborators can be based at other institutions, or be associated with appropriate citizen scientist associations.

The principal investigator must be an active researcher who takes intellectual responsibility for the project, its conception, any strategic decisions called for in its pursuit, and the communication of results. The principal investigator must have expertise and a track record in the field dealt with in the proposal, and they must play an intellectual leadership role in both the development of the proposal and the implementation of the activities covered in the project. The principal investigator must have the capacity to make a serious commitment to the project and cannot assume the role of a supplier of resources for work that will largely be placed in the hands of others. S/he will take responsibility for the management and administration of resources allocated to the application.

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<sup>1</sup> NRF recognised research institutions are declared (and gazetted) by the Department of Science and Technology and include Public South African (SA) Higher Education institutions (HEIs), Science Councils and other research performing public institutions. The list is available on the NRF Submission System at: <https://nrfsystem.nrf.ac.za/nrfmkii/>

A co-investigator is an active researcher who provides significant commitment, intellectual input, relevant expertise into the design and implementation of the research application. S/he will be involved in all or at least some well-defined research activities within the scope of the application. South African-based co-investigators are eligible to receive NRF funds from the grant if the team's application is successful. Post-doctoral fellows, students, technical and support staff should NOT be listed as co-investigators.

Research associates / collaborators are individuals or groups who are anticipated to make relatively small but meaningful contributions to the research endeavours outlined in the application. Research associates/collaborators will not actively participate in the design and implementation of the research application. They are not considered a part of the core research team.

#### **4.2.4 Eligibility criteria**

The following eligibility criteria are applicable for the large integrated team projects:

- Only researchers at NRF recognised research institutions<sup>2</sup> in South Africa as described in Section 4.2.2 are eligible to apply as a principal investigator. (Please note that post-doctoral fellows, students, technical and support staff are not eligible to apply.)
- For these applications (concept note and full proposals), the core research team consists of a principal investigator (i.e. applicant) and one or more co-investigator(s). The project may also include research associates / collaborators. The research team structure rules are described under 4.2.3.
- Funding will only be allocated to projects involving more than one institution, but teams must be led by an identified principle investigator. Funds will be made to a recognised research institution under the name of the principle investigator who can allocate part of the grant to team member institutions.
- Projects must include a minimum of five team members from a minimum of three institutions, but teams that involve all relevant specialists will be favoured.
- Project teams must include at least one young researcher (younger than 40 at the time of application) and ensure adequate mentorship and involvement as necessary.
- Projects must include postgraduate training.
- Projects must identify specific users of the knowledge generated and information co-ordinated and must indicate how engagement with users has been or will be addressed to ensure that data needs are met in terms of what is generated and mobilized and how it is accessed by users.
- Projects must clearly state the impact of the project on understanding and mitigation of global change and / or the bio-economy.
- Projects must be in line with one of the focus areas identified (4.2.1).

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<sup>2</sup> NRF recognised research institutions are declared (and gazetted) by the Department of Science and Technology and include Public South African (SA) Higher Education institutions (HEIs), Science Councils and other research performing public institutions. The list is available on the NRF Submission System at: <https://nrfsystem.nrf.ac.za/nrfmkii/>

- Projects must generate primary biodiversity data sets.
- Projects must contribute to the compilation of species pages for the EoL.
- Projects must provide specimens for barcoding or produce DNA barcodes.
- Successful applicants must sign the NRF Conditions of Grant (COG) agreement as specified in the attachments to the award letter.
- The data generated or mobilized through the grant must be provided to the FBIP / SANBI at the end of the project. This is to ensure that the data can be archived, integrated and made accessible for a range of applications and products.
- Data deliverables as stated in the proposal must be made available at the end of each year, and all data must be submitted six months after the end of the three-year project (i.e. 42 months after the signing of the Conditions of Grant agreement).
- Grantholders who have not submitted data within the specified timeframes from previous grants will not be eligible to receive further funding from the FBIP until the data have been submitted.

For the small grants (and Biodiversity Surveys when called for) the following eligibility criteria are applicable:

- Only researchers based at NRF recognised research institutions<sup>3</sup> in South Africa as described in Section 4.2.2 are eligible to apply as a principal investigator. (Please note that post-doctoral fellows and students are not eligible to apply.)
- Team members may also include a co-investigator(s) and research associates / collaborators as specified under 4.2.3.
- Projects must identify specific users of the knowledge generated / information co-ordinated and must indicate how the data will be made accessible.
- Proposals must indicate how the project will impact on understanding and mitigation of global change and / or the bio-economy.
- Successful applicants must sign the Conditions of Grant (COG) agreement as specified in the attachments to the award letter.
- The data generated or mobilized through the grant must be provided to the FBIP / SANBI at the end of the project. This is to ensure that the data can be archived, integrated and made accessible for a range of applications and products.
- Data must be made available no later than 18 months after the date of signing the Conditions of Grant Agreement for small grants, or 30 months after signing for two-year surveys.

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<sup>3</sup> NRF recognised research institutions are declared (and gazetted) by the Department of Science and Technology and include Public South African (SA) Higher Education institutions (HEIs), Science Councils and other research performing public institutions. The list is available on the NRF Submission System at: <https://nrfsystem.nrf.ac.za/nrfmkii/>

- Grantholders who have not submitted data within the specified timeframes from previous grants will not be eligible to receive further funding from the FBIP until the data have been submitted.

Projects must:

- generate or mobilize primary biodiversity data sets (species occurrence or specimen data) and / or
- contribute to the compilation of species pages for the EoL, and / or
- provide specimens for barcoding or produce DNA barcodes for species, and / or
- resolve taxonomic problems to unlock knowledge critical to other projects

#### 4.2.5 Specific funding conditions

**Ethics:** All activities undertaken by the research team will need to meet the required ethics standards of the contracting institution. FBIP management reserves the right to request ethics clearance certification from the Principle investigator (PI).

**Research permits:** Obtaining research permits is wholly the responsibility of the PI. Proposals must indicate that due consideration has been given to all permitting requirements for implementation of the project. This information must be included under the ethics section of the proposal. Some guidelines for permits are provided at

<http://www.sanbi.org/information/infobases/collection-permits>. FBIP management reserves the right to request copies of the permits from the PI.

**Research outside SA:** Research is limited to South Africa (including Prince Edward and Marion Islands).

**Reporting:** FBIP has reporting requirements over and above the annual progress reports required by the NRF. The FBIP management team collates grantholder reports to inform overall reporting to the DST. Successful applicants will be expected to provide email updates and additional reports to the FBIP Management team.

**DST Key performance areas (KPIs):** FBIP is contractually bound to the DST to produce deliverables such as student numbers, peer reviewed papers and foundational biodiversity data. Following the award of the grant, deliverables will be agreed to between the PIs and the FBIP Management Team.

**Data submission:** Data sets generated through projects funded by the FBIP must be submitted to FBIP staff unless the data have been submitted directly to BOLD or EoL. In the latter case, lists of specimens with links to web pages must be provided to the FBIP Manager. Where appropriate the data will be integrated into the SANBI portal or submitted to CoL, EoL or GBIF. Data must be made available no later than 18 months after the date of signing the Conditions of Grant Agreement for small grants, or 30 months after signing for two-year surveys. In the case of integrated team projects, data deliverables as stated in the proposal must be made available at the end of each year, and all data must be submitted six months after the end of the three-year project (i.e. 42 months after the signing of the Conditions of Grant agreement).

**Formats and standards for data submission:** Data submitted must conform to FBIP requirements which are aligned with global standards (see Appendix A).

**Public release of data:** The FBIP Data Release Guidelines are attached as Appendix B.

### 4.3 Application process

**Table 1: Guidelines to application process**

<b>Assessment Process</b>	Panel-peer review: Panels will be selected based on their broad experience in terms of the respective knowledge field and their research standing.
<b>Assessment criteria</b>	The score card below (Table 2) will be used.
<b>Where and how to apply?</b>	All applications must be submitted via the NRF's Submission System <a href="https://nrfs submission.nrf.ac.za">https://nrfs submission.nrf.ac.za</a> . Please select the ' <b>Foundational Biodiversity Information Programme Call</b> ' under ' <b>Create New Application</b> '.
<b>Documentation required</b>	All documents must be submitted online and these include the following: <ol style="list-style-type: none"> <li>1. Completed application form (please ensure that CV is updated).</li> <li>2. Letters from co-investigators and collaborators confirming their participation in the proposed research (<b>only for full proposals of large, integrated team projects</b>).</li> <li>3. Any additional supporting documents.</li> </ol>
<b>Funding decision process</b>	In general, the NRF's funding decisions are informed by the review panels' total weighted score for each assessed application. The NRF will fund the top-scoring applications within the programme specific budget.
<b>Feedback</b>	In principle, feedback on the assessment of the application is regarded as a crucial value-adding function of the NRF. In a limited number of cases, feedback from panel members who evaluated your application will be sent. These selected comments will be provided to give insight into some of the thinking that informed the grant decision-making process, and to give constructive support to applicants.

**Table 2: NRF Scorecards for assessment**

Each criterion is graded on a scale as follows:

<b>Scoring scale to be used</b>		
<b>Score</b>	<b>Meaning of score</b>	<b>Notes</b>
4	Excellent	It is clear that the proposed research and application could not be improved within the specific context.
3	Above average	The proposed research and application is above average but could still be improved within the specific context.
2	Average	Both the research application and proposed research is average within the appropriate context.
1	Below average	The application and proposed research is below average. This could be improved with amendments/revisions.
<b>Context</b>		
Note: The scoring process must be made with sensitivity to the context in which the proposal is made. The context will include the research field or discipline. It will also include other relevant influences such as societal and institutional textures.		

**Concept documents (Large integrated team projects):**

<b>Foundational Biodiversity Information Programme: Concept documents</b>					
*Alignment to Programme and focus areas must score minimum of 3 to be scored further					
<b>Criteria</b>	<b>Subcriteria</b>	<b>Details</b>	<b>Score / 4</b>	<b>Weight (total = 100%)</b>	<b>Weighted score (total=4)</b>
Track record of PI	Past record in research and leadership / management	Publications, conference presentations, project management experience		20%	
*Concept alignment to Programme and focus areas		Foundational biodiversity knowledge / information generation, co-ordination, dissemination and application in line with the outputs required for FBIP. Project concept within one of the focus areas identified		30%	
Feasibility		Is the project achievable within a 3-year period relative to the team and resources (funds, facilities) available?		20%	
*Outputs and Impacts	Outputs Impacts	What are the anticipated outputs? What will the impact of the outputs be on global change understanding and / or the bio-economy? Are these realistic?		30%	

**Full proposals (Large integrated team projects):**

<b>Foundational Biodiversity Information Programme</b>					
<b>Criteria</b>	<b>Subcriteria</b>	<b>Details</b>	<b>Score / 4</b>	<b>Weight (total = 100%)</b>	<b>Weighted score (total=4)</b>
Track record and team	Past record in research and leadership / management of team leader	Publications, conference presentations, project management		10%	
	Team members specified with expertise and role in project	Different institutions represented; relevant expertise involved. If the concept aims to include role players along the entire value chain has this been adequately addressed?			
Capacity development	Young researcher/s involved	Young researcher/s identified and role specified		10%	
	Postgraduate training opportunities outlined	Postgraduate projects specified; number of postgraduate projects and these realistic			

Proposal	Quality of the proposal document	<p>Is there a clear aim and objectives that align with the objectives of the Programme?</p> <p>Are the proposed activities in line with the objectives?</p> <p>Are the anticipated outputs aligned with those of the Programme?</p> <p>Does the proposal indicate a solid understanding of foundational biodiversity knowledge generation and information sources and requirements?</p>		20%	
Feasibility		<p>Is there a detailed workplan with specific activities and outputs? Is there a clear schedule and reasonable timeframes for activities and outputs?</p> <p>Are the roles and contributions of all team members specified?</p> <p>Is the budget reasonable considering the proposed activities and outputs?</p> <p>Is there sufficient detail in the budget to allow assessment of feasibility?</p>		30%	
Impacts		<p>Have the impacts on global change and / or the bio-economy been specified?</p> <p>Are these realistic?</p> <p>Have the users of the knowledge / information been identified?</p> <p>Will there be a direct or indirect change in global change understanding / mitigation or economic opportunities because of the project?</p> <p>Has consideration been given to the format in which the knowledge / information will need to be made accessible (even if this is not done by the project)?</p>		30%	

### Small grants and Biodiversity Surveys (when offered):

Foundational Biodiversity Information Programme					
*Applicants must score a minimum of 3 for Feasibility and for Impacts to be scored further					
Criteria	Subcriteria	Details	Score / 4	Weight (total = 100%)	Weighted score (total=4)
Track record of applicant	Past record in research and expertise in foundational biodiversity information	Publications, conference presentations		10%	
Proposal	Quality of the proposal document	Is there a clear aim and objectives that align with a problem statement and with the objectives of the Programme?		20%	
*Feasibility	Workplan	Is there a detailed workplan with reasonable timeframes for activities and outputs? Are the timeframes in line with the FBIP funding period? Are the roles and contributions of all participants specified?		30%	
	Budget	Is the budget reasonable considering the proposed activities and outputs? Is there sufficient detail to allow assessment of feasibility?		10%	
*Impacts		Have the impacts on global change and / or the bio-economy been specified? Are these realistic? Have the users of the knowledge / information been identified? Has consideration been given to the format in which the knowledge / information will need to be made accessible (even if this is not done by the project)? To what extent will the project contribute to the FBIP deliverables?		30%	

#### 4.4 Management of Programme

SANBI is responsible for managing the implementation of the Programme in order to achieve the specified outputs in the Business and Strategic Plans. SANBI (Programme Manager) will liaise with the NRF Global Change (GC) Programme Director to report on the Programme to the DST. The Grants Management and Systems Administration (GMSA) and Reviews and Evaluation (RE) of the NRF manages the grant call distribution, the online submission system, the panel review process, grant disbursement, tracking of expenditure by grantholders and reporting to the FBIP Programme Manager and GC Programme Director on expenditure. A Steering Committee provides strategic direction for the FBIP.

## 5. FINANCIALS

### 5.1 Funding model

The funding is allocated from DST to the NRF as ring-fenced funds as part of the Global Change Programme grant.

Operating funds are allocated from the NRF to SANBI on an annual basis.

### 5.2 Programme budget for research grants

The total budget for large integrated team projects is **R6 million** for the year **2016/17** of which **R2 million** is allocated for a **new** large integrated team project for selection in 2016 and implementation in 2017. The proposed collective budget for the small strategic projects is approximately **R2 million** per annum.

### 5.3 Funding support and ranges

All funding allocated through the Programme will be for research purposes under the auspices of the NRF standard grant and finance policies. The money is released on acceptance of the conditions of grant both by the applicant and his/her employing/affiliated institution.

The following research expenses may be not be requested / are not funded through this Programme: salaries of team members, project management fees, sabbaticals and publication page charges. There may be other items that are excluded according to NRF conditions.

#### Large integrated team projects:

- No funding is available for the development of the concept notes of large, integrated team projects.
- Limited seed funding is available as a once off payment in order to assist teams whose concept note is selected for further development into full proposals (R20, 000 per team).
- For the full large, integrated team projects, the range of funding available is R500, 000 to R2 million per annum for a three year period (R1, 500,000 - R6, 000,000 in total per project, with a maximum of R2 million in any one year).
- Depending on funding availability, one or two full projects are selected for support for a three year period, with the first transfer of funds being made in the year after the review process has been completed. One new project will be selected in 2016 for funding in 2017-2019.

#### Small projects:

- For the small strategic grants, the amount of funding and the number of grants disbursed will depend on the number of applications submitted and the amount allocated to this part of the Programme by the FBIP Steering Committee.
- The funding will range from R50, 000 – R200, 000 per annum.

### Grantholder-linked student support values (Only applicable for large integrated team projects)

- Bursaries are awarded as per the NRF rules for grantholder-linked bursaries and will require the nomination of the selected students (this can be done online at <https://nrfs submission.nrf.ac.za>).
- The 2016 NRF Bursaries, Scholarships Values, Rules and Guidelines can be downloaded at: [www.nrf.ac.za/sites/default/files/documents/Funding%20your%20Research%20Future%20NRF%20Bursary%2C%20Scholarships%20Value%20Rules%20and%20G...pdf](http://www.nrf.ac.za/sites/default/files/documents/Funding%20your%20Research%20Future%20NRF%20Bursary%2C%20Scholarships%20Value%20Rules%20and%20G...pdf)
- When an award is supplemented from grantholder running costs, it can be topped up to a maximum of only R20 000 p.a.

Student support is available within the following categories:

- Honours / Final year BTech student assistantships (full time) R 20 000 p.a.
- Masters (full-time) R 80 000 p.a. (2 years)
- Doctoral (full-time) R 120 000 p.a. (3 years)
- Postdoctoral fellowship (pro rata per month) R 200 000 p.a. (3 years)

Note: According to the NRF 2016 Bursaries, Scholarships Values, Rules and Guidelines document, for:

- Final year undergraduate and Honours/BTech student assistantships (full time), only South African citizens are considered, with a minimum of 50% black (inclusive of African, Indian and Coloured) students within a grant.
- Masters and Doctoral bursaries are awarded according to the following ratios: 87% South African (including permanent resident), 5% SADC, 4%; rest of African continent and 4% from non-African countries. These ratios need to be applied at the FBIP level.
- Postdoctoral Fellowships: No ratio applies.

## **5.4 Financial control and reporting**

Financial reporting is done by GMSA; and a written approval for continuation of the large integrated projects will be given annually to the team leader of the project by the Programme Manager. Large, integrated team projects will be supported for up to three years on condition that:

- Sufficient progress is demonstrated annually through the submission of an annual progress report (APR) and through the oral presentation of progress reports at an annual technical visit;
- There is sufficient evidence of scientific outputs / outcomes and critical mass involved in the project.

## **6. MONITORING AND EVALUATION OF THE PROGRAMME**

### **6.1 Reporting (Quarterly and Annual)**

The Programme Manager and Global Change Programme Director integrate information quarterly and annually into overall reporting to DST on Global Change Programme: Progress against outputs specified in the Performance Plan for the

Programme (see table). Total grant allocation and expenditure for the year (GMSA to report to Programme Manager and Global Change Programme Director); Budget and expenditure against budget on items other than grants.

**Table 3: Key Performance Areas and Targets for Annual Reporting (2013-2017)**

KPAs	Strategic Objectives	Targets	Timeframes
<b>1. Allocation of funds to integrated projects which generate and provide foundational biodiversity knowledge according to priority needs</b>	1.1 Generate knowledge and mobilise existing data to address priority knowledge / information gaps identified by consultation or involvement of relevant stakeholders who use and apply foundational biodiversity information in decision-making for sustainable use and development	3 projects funded and implemented	2013: 1 project funded and completed in 2016 2014: 1 project funded for completion in 2017 2015: 1 project funded for completion in 2018 2016: 1 project funded for completion in 2019
<b>2. Co-ordination of foundational biodiversity knowledge / information generated or compiled through the projects for dissemination</b>	2. 1. Contribute content to an integrated information management and dissemination system to provide long-term access to outputs from the FBIP.	Targets for 2017: i. A national inventory of all South African species to include 70% of South Africa's species  ii. Co-ordinated species pages for priority species in South Africa: 900 species pages compiled  iii. 700,000 specimen records (primary data) assembled  iv. Barcode data obtained and co-ordinated for 900 species	2016/2017: inventory: 100% plant species (24,000) 80% animal species (50,000) 50% fungi and microbe species (6,000)  Species pages: 2013: 100 species 2014: 200 species 2015: 300 species 2016: 300 species  Species occurrence records: 2013: 100,000 records compiled 2014: 200,000 records compiled 2015: 200,000 records compiled 2016: 200,000 records compiled  Barcode data: 2013: 100 species 2014: 200 species 2015: 300 species 2016: 300 species
	2.2. Publication of knowledge generated in the scientific literature	30 papers published	2014: 10 papers published 2015: 15 papers published 2016: 15 papers published
<b>3. Capacity development for biodiversity knowledge generation, dissemination and application.</b>	3.1. Training of postgraduate students in the generation, management and dissemination of foundational biodiversity knowledge.	Minimum of 5 postgraduates involved in each large funded project (includes Hons, MSc and PhD). Minimum of 5 postgraduates involved in small projects per annum.	2016/2017: 20 students graduated / registered  2016/2017: 20 students involved in projects

	3.2. Development of capacity for application / use of the knowledge / data.	Minimum of 3 courses run for researchers involved in programme. Minimum of 3 courses run for data users.	2015: 2 courses run 2016: 2 courses run
	3.3. Provision of opportunities for emerging researchers.	Minimum of 2 emerging researchers involved in each funded project	2013: 4 emerging researchers participating in programme 2014: 8 emerging researchers participating in programme 2015: 12 emerging researchers participating in programme 2016: 12 emerging researchers participating in programme
<b>4. Developing an understanding of best practices for ensuring that foundational biodiversity knowledge generated and disseminated is taken up for use and application in decision-making and sustainable use</b>	4.1. Monitoring the uptake and application of the knowledge generated for decision-making and creating economic activities	Annual reporting by principle investigators on contribution of research to decision-making / economic benefits. Annual measurement of the number of visits to integrated website, number of records downloaded. Survey of application / use of data.	Report produced on use of data provided on web site.
	4.2. Promotion of the programme and its outputs to increase use and application of the knowledge	Minimum of six media releases / articles per annum on programme and outputs (18 in total for period). Promotional information on programme and outputs and updates to be distributed electronically through list servers, on appropriate websites and at relevant conferences / forums (15 in total during reporting period).	2013: 6 media releases, 3 promotional releases distributed 2014: 12 media releases, 6 promotional releases distributed 2015: 12 media releases, 6 promotional releases distributed 2016: 12 media releases, 6 promotional releases distributed

## 6.2 Timeframes for evaluation

The Programme will be evaluated after three years. An evaluation panel (maximum of 3 members) will be constituted to evaluate the following:

- outputs of the Programme relative to the strategic objectives and targets,
- impact of the Programme in terms of the uptake and application of knowledge generated,
- financial aspects of Programme (administrative vs disbursement of grants),
- appropriateness of the governance structure and functioning.

### 6.3 Broad terms of reference for evaluation

Evaluation of the Programme will require that the following be assessed:

- To what extent were the targets specified in the Strategic Plan and Business Plan of the Programme achieved?
- To what extent were the broader strategic objectives achieved?
- What has the impact on the Programme been in terms of research, decision-making and economic opportunities?

This evaluation will require access to databases of outputs, but interviews with stakeholders who need and use the knowledge and information will also be required to allow a qualitative assessment.

The evaluation must also include an analysis of the expenditure in terms of administrative vs research operations vs capacity development, and an analysis of the governance structures and administrative efficiency and effectiveness.

The evaluation process should also include the identification of future priorities that need to be addressed in the projects funded.

### 6.4 Utilisation of the results of the evaluation

The evaluation will be used to review and revise administration and governance of the Programme, to review and revise the strategic objectives and targets, and to review and revise the priority themes and approach to projects and grants.

### 6.5 Contact details

REFER QUERIES TO	
Programme Co-ordinator:	Grant Officer:
Name: Dr Lita Pauw Tel: 012 843 5113 email: <a href="mailto:L.Pauw@sanbi.org.za">L.Pauw@sanbi.org.za</a>	Name: Mmamokete Mabuela Tel: 012 481 4088 email: <a href="mailto:mmamokete.mabuela@nrf.ac.za">mmamokete.mabuela@nrf.ac.za</a>

### LIST OF ACRONYMS

CBD – Convention on Biological Diversity

DST – Department of Science & Technology

EoL – Encyclopedia of Life

FBIP – Foundational Biodiversity Information Programme

GC – Global Change

GMSA – Grant Management and Systems Administration

IBOL – International Barcode of Life

NFR – National Research Foundation

PI – Principle Investigator

KPI – Key Performance Areas

RE – Reviews and Evaluation

SANBI – South African National Biodiversity Institute

SABIF – South African Biodiversity Information Facility

SABI – South African Biosystematics Initiative

## APPENDIX A

### FORMAT AND STANDARDS FOR DATA SUBMISSION

#### **Species Checklist Format and Standards**

Species checklists / checklist contributions must be submitted according to the Catalogue of Life (2013) standards and fields. Please see: <http://www.catalogueoflife.org/colwebsite/content/contributing-your-data> for details of the required fields and for a downloadable template. Data can be submitted to the FBIP in either MS Access or Excel format.

#### **DNA Barcode Data**

Grantholders undertaking DNA barcoding must use the standard protocols for their taxon, and must meet the required standards for recognised BARCODE data (see <http://www.boldsystems.org/index.php/Resources> and [http://www.barcodeoflife.org/sites/default/files/DWG\\_data\\_standards-Final.pdf](http://www.barcodeoflife.org/sites/default/files/DWG_data_standards-Final.pdf)).

Data must be made publically accessible in the BOLD system. Lists of specimens that have been barcoded with a reference to data in the BOLD or other recognised database must be provided to the FBIP. Microbial sequence data not accommodated in BOLD should be submitted to Genbank.

#### **Species Pages for the Encyclopedia of Life**

Species information can be captured in MS Access or Excel format, or on the Word template and submitted to the FBIP for dissemination via the SANBI portal and EoL where appropriate. Headings / content categories and the Word template are available from the FBIP.

#### **Specimen / Occurrence Data**

The required standard for specimen or occurrence data is the "Simple Darwin Core". This is a subset of the terms that have common use across a wide variety of biodiversity applications. The terms used in the Simple Darwin Core are those that are found at the cross-section of taxonomic names, places, and events that document biological occurrences on the planet. The fields and descriptions for the Simple Darwin Core can be found at: <http://rs.tdwg.org/dwc/terms/simple/index.htm> or can be obtained from the FBIP. While the number of fields included is large, not all are critical for data to be submitted to the FBIP. An Excel template that includes the critical fields can be provided to grantholders submitting species occurrence data if required.

## APPENDIX B

### FBIP DATA RELEASE GUIDELINES

#### September 2015

The SANBI Biodiversity Information Policy Framework provides legal principles and guidelines on managing biodiversity information. Through this Framework SANBI strives to ensure easy access to information whilst simultaneously providing protection to sensitive data and maintaining intellectual property rights.

**In terms of the release of data from the FBIP grant recipients/data publishers a number of recommendations are provided below:**

#### **Public Release of Data**

- Biodiversity data accessible via the SANBI network are openly and universally available to all users. All grant holders are to agree in writing that data produced through the use of FBIP funding can be made publically accessible without restriction, but attribution is required so that the data provider is acknowledged by all users of the data.
- Individuals and institutions must agree to make the data produced from FBIP grants available six months after the completion date of the project as stated in the proposal.
- For projects generating DNA barcode data, these are submitted to the Barcode of Life Database (BOLD) held by the international Barcode of Life (iBOL), and are made accessible according to the iBOL data release and resource sharing policy (<http://ibol.org/resources/data-release-policy>). iBOL considers all barcode data in BOLD to be a community resource to be shared publically according to the terms and conditions outlined in its policy, but encourages users of the data to acknowledge the contributor and source.
- Data submitted in BOLD will be made public and transferred to GenBank for public release prior to user initiated publication. Data release will follow a two phase process: Phase 1: quarterly release of all generated sequence data and high level taxonomic information. Phase 2: release of additional data elements that require manual curatorial efforts and detailed taxonomic enquiry.
- In current research practice, a researcher or institution may be granted temporary exclusive use of the data produced. In the event of the open dissemination of data posing a risk to a student thesis, the data provision to the FBIP can be delayed for one to two years on request to the FBIP.
- In the instance of data produced by a student that is withheld from public release the data must still be provided to the FBIP when the project ends. This data is required for monitoring and reporting purposes. In the event that the grant holder / student has improved the data since its submission to the FBIP, a new version should be provided for dissemination.
- Where data are considered to be sensitive (the GPS co-ordinates of a collection locality for a species threatened by over-collecting) or confidential (eg. name of human subjects from which disease samples were taken), then GPS co-ordinates can be disseminated at a coarse scale or the names of human subjects must be removed from data sets. These or similar restrictions must be stated by the grant-holder when data are submitted to the FBIP.

- **For FBIP funded projects, data being served via the SABIF/SANBI-GBIF platform, will be associated with one of three licences i.e. CC0, CC-BY or CC-BY-NC. All publishers are to choose a licence equivalent to: CC0, CC-BY or CC-BY-NC**

- **CC0** - Fully-open public access
- **CC-BY** - Attribution required
- **CC-BY-NC** - Attribution required, non-commercial use only.

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#### **Additional Notes:**

#### **GBIF is updating its data sharing / licensing terms for publishers.**

At its meeting in India last year, the GBIF Governing Board agreed to a policy (<http://www.gbif.org/newsroom/news/data-licensing-and-endorsement>) to ensure that all species occurrence datasets within GBIF.org would in future be associated with one of three Creative Commons licence designations: CC0, CC BY or CC BY-NC.

This policy change followed a stakeholder consultation earlier in 2014 (<http://www.gbif.org/newsroom/consultations#licensing>), in which respondents indicated the need to clarify and standardize the terms of using data accessed through GBIF.org, both for publishers and for users.

#### **CC0 (Copyright Waiver)**

Several countries and significant publishers of data within GBIF have already adopted unrestricted **public domain tools** (rather than licences), in particular **CC0**, as the basis for data publishing within their networks, arguing that other options are not legally valid and/or that this option best supports open science. **GBIF should support data publishers adopting public domain tools wherever these are appropriate.**

#### **CC-BY:**

A number of institutions publishing data within GBIF currently have policies that do not allow data to be shared without asserting intellectual property rights or defining restrictions on use. Several significant networks publishing data within GBIF have existing data sharing agreements with their publishers and cannot vary the terms associated with these agreements. **Under current circumstances, GBIF cannot move completely to adoption of public domain tools (e.g. CC0) without risk of serious disruption and loss of data.**

#### **CC-BY-NC**

Several responses also indicated that, at least at present, some of their data publishers expect to be able to restrict data use to non-commercial activities. However, there is no clear and accepted definition of which activities are to be considered non-commercial. As with other restrictions on data use, it is unlikely that such restrictions could be enforced in a consistent way throughout the network. Creative Commons indicates that non-commercial restrictions do not contribute to **"Free Culture"**. **Under current circumstances, GBIF may face some disruption and loss of data if it excludes the option for data publishers to request exclusion of commercial uses.**