

Natural Science Collections Facility

Report to the Department of Science & Technology

01 March 2017 – 31 March 2018



science
& technology
Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

SANBI 
Biodiversity for Life
South African National Biodiversity Institute

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1. Rationale and Scope

- Research collections are essential for all countries with scientific enterprises, and they should be considered as large scale, global research infrastructure. South Africa has an estimated 20 million objects or specimens representing over 100,000 different species in natural science collections.
- Natural science collections and the data associated with these are a crucial resource for a wide range of society both nationally and globally, including researchers, environmental assessment consultants, land use managers and planners, farmers, bioprospectors, students, learners and decision-makers.
- South Africa's natural science collections are managed in a highly fragmented and largely isolated environment and there is no common strategy or approach to research which means that their full potential as a national research infrastructure is not being realised. In addition, the specimen data are largely inaccessible, which causes delays in decision-making or poor decision-making relating to sustainable development and sustainable harvesting of natural resources, both of which have considerable economic impacts. Inaccessible data also limits their use in large scale, multi- and trans-disciplinary studies.
- The NSCF aims to address this situation, which will have positive impacts on research in numerous fields, on the economy through providing critical information for agriculture, fisheries, pest control, alien invasive management, natural products, and on society which benefits from biodiversity in virtually all aspects of life.
- The NSCF is a distributed network of institutions that hold natural science collections, with a Central Coordinating Hub hosted at SANBI in Pretoria. SANBI is responsible for the overall implementation of the project plan and management of the budget allocation for the NSCF from the DST. The individual institutions will continue to be supported by their existing structures, and continue to report to these but will collaborate to meet the objectives of the NSCF, and will receive support in order to enable this.
- The NSCF' scope is limited to preserved plant, animal, fungi, palaeontology and geology collections, and during this phase only those institutions that have such collections that are actively managed for research purposes and that are accessible to the global research community in terms of both material and data are included. This is in line with the requirements to be considered as national research infrastructure. Four national museums, under the national Department of Arts & Culture, five provincial museums under the Eastern and Northern Cape Department of Sports, Recreation, Arts & Culture, one municipal museum, three science councils, and three universities are involved in the NSCF for the 2016/17 to 2018/19 period. For the herbaria, the participating institutions were limited to the "big 6 collections" as identified in the NRF report of 2011. This limit was required because of the large number of small herbaria scattered across South Africa (over 80 of these), and the extent to which they meet the requirements for qualifying as research collections at this stage is limited. In order to be able to establish the NSCF and to achieve outputs and outcomes in the short term, a phased approach is essential, with the major institutions participating initially, and in future, a broader approach can be considered.

Expected outputs, outcomes and impacts

Outputs	Outcomes	Impact
<ul style="list-style-type: none"> Well managed, accessible and secured collections of biological specimens 	<ul style="list-style-type: none"> Increased research and education outputs in a range of fields, by national and international scientists 	<ul style="list-style-type: none"> Increased knowledge of South Africa's past and present biodiversity for the benefit of all of society; International recognition for SA collections
<ul style="list-style-type: none"> Integrated and openly accessible specimen data sets, including images of specimens 	<ul style="list-style-type: none"> Increased research and education outputs in a range of fields; inclusion of wide range of species (including fossils) in decision-making for development 	<ul style="list-style-type: none"> Sustainable development and use of biodiversity; Involvement of broader society in decision-making
<ul style="list-style-type: none"> Postgraduates; Collection based staff upskilled; School learners education programmes 	<ul style="list-style-type: none"> Increased number of postgraduates graduate; upskilled and qualified collections-based staff; school learners' education enhanced and interest in science and biodiversity increased 	<ul style="list-style-type: none"> Young researchers qualified for range of positions inside and outside collections and academia; Skilled and qualified staff; motivated staff; Improved marks in life sciences; increased number of students in science
<ul style="list-style-type: none"> Services and tools for the identification of biological specimens, including contributions to DNA barcode reference library 	<ul style="list-style-type: none"> Improved service for the identification of biological specimens 	<ul style="list-style-type: none"> Rapid and accurate identification of materials for enforcement, import and export, public health, conservation
<ul style="list-style-type: none"> Improved public understanding of biodiversity, its importance for human well-being and for national and cultural identity 	<ul style="list-style-type: none"> Society participates in and contributes to collection and biodiversity related activities; cross cultural appreciation for varied values for species 	<ul style="list-style-type: none"> Biodiversity and collections viewed as national assets and treasures; social cohesion; citizens empowered to engage in decision-making on biodiversity issues

Duration of the contract

The NSCF falls within the South African Research Infrastructure Roadmap programme of the Department of Science & Technology. The South African National Biodiversity Institute (SANBI) has been contracted by the DST to co-ordinate the implementation of the NSCF. The contract between SANBI and the DST is from 24 February 2017 to 31 March 2020.

2. Aim and objectives

The overall aim of the NSCF is to ensure that ***collections and associated data are used for high quality research and decision-making to address issues of socio-economic importance***

In order to realise this aim, the NSCF has five strategic objectives.

- SO 1. Collections (=research infrastructure) secured and accessible physically and virtually for research
- SO 2. Data from specimens in collections accessible and used for managing collections, research and decision-making
- SO 3. Research on collections and associated data addresses issues of national and global relevance
- SO 4. Collections and associated research provides services to identify biological specimens for a range of stakeholders including in the agriculture, health, environmental management and academic sectors
- SO 5. Collections used for serving broader society through education, citizen science and public understanding projects with emphasis on inspiring young scientists and promoting South Africa's unique biodiversity assets.

In order to achieve these objectives the following enabling strategies will be critical:

1. Transform the current fragmented natural science collections landscape by establishing the NSCF with participatory planning, and collaborative implementation, monitoring and reporting processes and systems.
2. Ensuring that appropriate capacity to curate collections, manage data and research the collections is available and well qualified staff are retained.

In the first three years (2016/17; 2017/18; 2018/19), the main focus is on establishing the NSCF, including the Co-ordinating Hub, Working Groups and governance structures and to ensure that the new approach for a single facility is operational. There will also be a focus on developing policies, procedures, standards and workflows across institutions, and establishing mechanisms for monitoring of implementation of policies, procedures and standards, and monitoring use of the collections and the associated outputs and outcomes. Collection storage facilities, security and research equipment will also be upgraded where this is strategic.

3. Progress: 1 March 2017 – 31 March 2018

NATURAL SCIENCE COLLECTIONS FACILITY Progress Report: 1 March – 31 March 2018

	STRATEGIC OBJECTIVE	3 year Outcome / Objective	DELIVERABLES	Progress to 31 March 2018
1	<i>Collections (=research infrastructure) secured and accessible physically and virtually for research</i>	i. Inventory of collections on the NSCF website	Website, with details of all publically accessible natural science collections	<ul style="list-style-type: none"> NSCF website was launched in October 2017 and is accessible at www.nscf.co.za List of the main collections, size and scope is available on the website.
		ii. Collections that are at high risk / high priority secured/ collection facilities upgraded	6 orphan collections integrated into major collections; upgrade of storage environments for priority collections	<ol style="list-style-type: none"> UKZN to absorb Killick herbarium (Ezemvelo KZN Wildlife) –2018-2019. Plan developed and digitisation will be completed before collection moved. SAIAB – absorption of Albany Museum fish collection(2018-2020). 236 lots incorporated but several thousand still to be incorporated. ARC to absorb East London Museum fungi collection ARC to absorb University of Pretoria Eicker fungi collection (2018/19) East London Museum Herpetology collection incorporated by Bayworld, 126 specimens incorporated. Under negotiation: University of Pretoria tick collection to be incorporated into the national tick collection at ARC-OVI. <p>Upgrade of collection facilities: SAIAB: upper collections floor renovated, 50 compacting shelves fitted.</p>

		<p>iii. A virtual museum for global use by researchers and broader society initiated</p>	<p>Website with information and images for South Africa's species (5000 specimens digitised); scanned versions of catalogues, field notes and other documents relating to collections</p>	<ul style="list-style-type: none"> • Data WG has discussed specifications and workflows for images of specimens and scans of documents. • Assessment of number of specimens and documents has been completed. • The Data Working Group agreed that 4 virtual museum portals will be available: Vertebrates, Karoo fossils and macro fungi will be hosted on a Symbiota platform and plants on the SANBI system.
		<p>iv. Tissue and DNA collections accessible for research</p>	<p>Basic facilities for storage of tissues and DNA linked to voucher specimens</p>	<ul style="list-style-type: none"> • Assessment of freezer needs was completed and included in budgets, and two freezers were delivered to SAIAB. • Plans for renovation of existing lab at National Herbarium to establish a DNA extraction facility and DNA / tissue collection for plants were finalised. • Preliminary plans for DNA extraction lab at ARC-OVR was drafted.
		<p>v. Common standards, procedures and monitoring programme for collections across institutions</p>	<p>Common set of documents for standards, procedures covering curation and access; monitoring process for implementation</p>	<ul style="list-style-type: none"> • Curation Working Group to meet in April 2018 to finalise common policies, standards and procedures covering curation and access.
2	<i>Data from specimens in collections accessible and used for managing collections, research and decision-making</i>	<p>i. Standards, processes and workflows for data capture, verification, upgrading and integration across institutions</p>	<p>Set of documents finalised and adopted by participating institutions</p>	<ul style="list-style-type: none"> • Discussions initiated at Data Working Group meeting; existing documents from institutions being gathered. • The Data Working Group held its third meeting in March 2018 where the draft policy document and process diagrams for data capture and quality assurance processes were reviewed and accepted by the committee. Detailed work plans for each activity are being drafted for circulation and acceptance by the committee. • A number of institutions are implementing standards and processes: representatives from 11 institutions actively involved in Data

				Working Group Committee membership and activities.
		ii. Verification and upgrading of specimen data for vertebrates (mammals, birds, reptiles, fish, amphibians), fungi and two plant families	Estimated 600,000 records updated, corrected and accessible	<p>Agreement was reached on the following:</p> <ul style="list-style-type: none"> Animals: start with reptile and amphibian data sets as a pilot and develop protocols and workflows. Workplan was developed. Assessment of the extent of reptile and amphibian data sets completed. Macrofungi data to be upgraded. Karoo fossil data to be upgraded. 3 plant families (Iridaceae, Proteaceae, and Fabaceae) to be upgraded. Detailed work plans are being drafted for circulation and acceptance by the Data WG committee. Standards for upgrading have been developed.
3	Research on collections and associated data addresses issues of national and global relevance	i. Large, collaborative and multidisciplinary flagship research project based on the collections and associated data: proposal	Project proposal and plan developed	Planned for 2019.
		ii. Accelerated description of new species where these are required for improving scientific quality of collection / strategically important research activities	Minimum of 60 new species described	<ul style="list-style-type: none"> 153 new species were described across 10 institutions including 30 new insect species from Iziko Museum collections and 20 new species of mite from National Museum.
		iii. Increased use of collections for research and capacity development	Minimum of 6 international scientists using collections (in addition to the current number of 100 per year)	<ul style="list-style-type: none"> Call for applications for travel grants for researchers to work on collections compiled and advertised in March 2018. A total of 126 papers were published using the collections during the 2017/18 year.

		iv. Upgraded research equipment and facilities at selected collection institutions	Equipment purchased and used by researchers	<ul style="list-style-type: none"> • Priorities discussed and agreed on by the Co-ordinating Committee. • Quotations for various items were obtained by participating institutions. • Equipment purchases were included in the Schedule of Payments for the Collaboration Agreements with 7 institutions. <p>To date the following research equipment items were purchased and set up:</p> <ul style="list-style-type: none"> • SAIAB: X-Ray machine repaired. • Iziko: Biodiversity lab fitted with microscopes and dedicated computers. • Albany Museum: three new desktop computers for Earth Sciences, Freshwater Invertebrates and the Herbarium.
4	<i>Collections and associated research provides services to identify biological specimens for a range of stakeholders including in the agriculture, health, environmental management and academic sectors</i>	i. Systems for monitoring identification services provided and for measuring impacts of this service	Database of specimens identified; purpose of identification; estimated 15000 specimens identified for agriculture, health, environmental management, researchers	<ul style="list-style-type: none"> • Online monitoring and reporting template developed and accessible to participating institutions for populating. • A total of 1,144,455 specimens were identified for clients across institutions; of these 1,063,026 were identified by the Agricultural Research Council Plant Protection Unit. Purpose of identifications include: farming diagnostics, pest management, weeds biocontrol, diamond prospecting, conservation management and planning, research, phytosanitary purposes, commercial crop production, quarantine services, archaeological assessment, determine species for rehabilitation, determine insect threats to shipment of coffee beans, determine outbreak in classrooms, public interest and horticulture.
5	<i>Increased public engagement and understanding in relation to the collections and</i>	i. NSCF website, with pages relevant for public, with relevant information and links to virtual museum	Website established and accessible; updated on at least weekly basis; used by broader society	<ul style="list-style-type: none"> • Website was launched in October 2017, live and accessible to the public. • Website is being updated with new information as it becomes available.

<p><i>discoveries based on these to inspire learners, students and citizen scientists and increase appreciation for South Africa's unique biodiversity assets.</i></p>			<ul style="list-style-type: none"> • Mechanism to monitor and report on the number of visitors to web page to be set up.
	ii. Outreach activities	8 events that promote collections; 4 school programmes using collections; 2 exhibits promoting collections; 2 popular articles on collections / NSCF / SA biodiversity	<ul style="list-style-type: none"> • Exhibition area is included as part of the new NSCF Hub building plans. • NSCF presented at the ZSSA/ESSA conference (July 2017), the BIM-FBIP Forum (August 2017) and at the international Society for the Protection of Natural History Collections (SPNHC) in Denver, Colorado by Bernhard Zipfel (June, 2017). • Brochure for the NSCF developed and printed. • Popular articles on the NSCF published in Thola magazine, Indwe and Business Day. • 114 outreach activities involving the collections were held across institutions with 41,165 attendees/learners exposed to the activities. Activities included general museum tours, school tours, student visits, International Museum Night and Heritage Day tours at Iziko, SciFest at SAIAB, Happy Earth Festival at KZN Museum.
	iii. Develop and implement a branding and marketing strategy for the NSCF and collections	Marketing and branding plan documented, with activities, products, timeframes and costing; activities initiated in line with plan	<ul style="list-style-type: none"> • Branding for NSCF website is complete and website is live and accessible. • Branding and marketing strategy for NSCF and collections to be developed

ENABLING STRATEGIES

1	<p>Transform the current fragmented natural science collections landscape by establishing the NSCF with participatory planning, implementation,</p>	<p>i. NSCF staff appointed: Project Manager; Co-ordinators for Curation; Data; Capacity Development; and Outreach and Communication; Administrative Assistant</p>	<p>Functioning Co-ordinating Hub</p>	<ul style="list-style-type: none"> • Project Manager appointed from 1 February 2018. Data Working Group Coordinator and Curation Working Group Coordinator appointed from 1 January 2018. • Outreach and Communication Coordinator post has not been filled, no suitable candidates applied. Filling of this post to be reconsidered.
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	<p>monitoring and reporting processes and systems.</p>			<ul style="list-style-type: none"> • Temporary administrative assistant is appointed until the permanent post is filled. • SANBI Director Zoology post filled for 6 months (1 March-31 August 2018) by acting Director. M. Hamer was relieved and freed up to focus fully on the NSCF leadership.
		<p>ii. Documentation for governance and operations of NSCF Co-ordinating Hub (TORs, guidelines, processes)</p>	<p>Finalised and approved documents that clarify operations of the NSCF Co-ordinating Hub, supported by Steering Committee, Co-ordinating Committee</p>	<ul style="list-style-type: none"> • Governance structures and TORs document accepted by Co-ordinating Committee • SANBI Board advised to replace Steering committee with Advisory Committee.
<p>1.1.</p>	<p>Establishing the Co-ordinating Hub and governance structures and mechanisms for planning, implementation, monitoring and reporting for the NSCF</p>	<p>iii. Steering Committee, with TORs for NSCF, meeting at least once per annum</p>	<p>Steering Committee support and agreement on Strategic Objectives, Deliverables and Budget</p>	<ul style="list-style-type: none"> • SANBI Board advised that decision-making authority lies within SANBI and not a Steering Committee. She suggested that there should therefore be an Advisory Committee. • Membership to be confirmed
		<p>iv. Co-ordinating Committee (managers or representatives from each participating institution) established; TORs developed; meeting at least quarterly basis to finalise objectives, activities, targets and resources, to monitor progress and provide information for reporting</p>	<p>TORs and operational plan finalised; minutes from meetings; objectives included in institution Annual Performance Plans (APPs)</p>	<ul style="list-style-type: none"> • Co-ordinating Committee was established and is functional (2 meetings were held - May and October 2017). • Collaboration Agreements were drafted and signed with seven institutions (Ditsong Museum, SAIAB, Iziko Museum, East London Museum, Amathole Museum, Albany Museum, ARC / OVI). Collaboration Agreement with PE Museum was drafted, and negotiations are underway to sign agreements with National Museum, KZN Museum and UKZN.
		<p>v. Five Working Groups, with Terms of Reference (TORs), meeting at least quarterly, detailed implementation plans and reports on progress against targets.</p>	<p>Objectives, activities and targets for each Working Group documented, with implementation plan; targets met</p>	<ul style="list-style-type: none"> • Working Group TORs developed. • Membership with representatives of participating institutions was finalised. • Three Data WG meetings were held. Curation WG meeting is scheduled for April 2018.

		vi. NSCF Co-ordinating Hub offices established (interim for 2 years, with only moveable assets purchased); initiation of the construction of the NSCF Co-ordinating Hub building	Co-ordinating Hub staff accommodated on temporary basis; design, authorisations and procurement for construction of new building at SANBI	<ul style="list-style-type: none"> • Design for new building finalised and specifications developed; approved by SANBI's Bid Specification and Adjudication Committees. Contract has been awarded. • R7.8 million was allocated for the building from SANBI's infrastructure budget. • EIA is required before construction can commence. • Coordinating Hub staff currently accommodated on temporary basis at SANBI Pretoria.
1.2.	Transformation of natural science collections: focus on changing culture to ensure that all staff support the NSCF and work towards a national rather than individual agenda	vii. NSCF Forum (every second year), for all collection institution staff to develop a new culture	NSCF Forum held to launch NSCF; all staff understand the aim and objectives	<ul style="list-style-type: none"> • Forum was held from 17-20 October 2017, in the KZN Drakensberg (Alpine Heath Resort). The forum and launch of the NSCF was attended by 153 participants and staff from 26 institutions. The next NSCF Forum will be held during the first half of 2019. • Presentations on the NSCF and discussion sessions were done for all staff at National Herbarium, KZN Herbarium, Compton Herbarium, Bolus Herbarium, Bews Herbarium, Ditsong Museum, Iziko Museum, KZN Museum, Durban Natural Science Museum, East London Museum, Port Elizabeth Museum, Amatole Museum, Albany Museum, SAIAB, ARC-PPRI Biosystematics; ARC-OVR and National Museum.
		viii. Change management / leadership coaching for managers to support the development of a new culture	Managers from participating institutions understand changes required for implementation of NSCF and achieving targets	<ul style="list-style-type: none"> • Change Management Consultants were appointed and the first change management workshop was held in the Eastern Cape from 26 February to 2 March 2018. 23 managers from 10 institutions attended the workshop. The next session is scheduled for May 2018.
		ix. Common standards and job descriptions for staff in collection institutions to professionalise collections posts	Common post titles, job descriptions and performance standards for staff in collection institutions	<ul style="list-style-type: none"> • A Working Group to deal with this was established.

2	Capacity development	i. Support for postgraduate students researching the natural science collections.	New postgraduate students using collections /data for their projects	<ul style="list-style-type: none"> • 4 MSc bursaries were awarded for students working on collection material. This was done through an open call, and applications were assessed by three members of the Co-ordinating Committee / delegates. 1 African Female, 1 African male, 1 White Male and 1 White Female were awarded bursaries. • 5 postdoctoral scholarships were awarded for research on South African collections or specimen data. 21 applications were received and assessed by panel. All recipients are women.
		iii. Capacity development for collections and data management staff: grants for young staff in collections to attend the international Society for the Protection of Natural History Collections (SPNHC) conference or the Taxonomic Data Working Group conference	International networking for young staff; additional skills and innovations for collections and data management to which young staff exposed	<ul style="list-style-type: none"> • A call was developed in 2017 for staff to travel to international conferences related to collection management / curation. Only one application was received and this was not considered to be in line with the scope of the call. • Second call for 2018 was advertised for staff to travel to international conferences related to collection management / curation.

4. Financial analysis

The first grant of R15 million was transferred to SANBI at the end of February 2017. The second grant of R17,800,000 was transferred in January 2018. The 2018/19 grant will bring the **total project income to R51,600,000.**

Expenditure to date is R13,099,630:

- Human Resources and support services costs amounted to R638,365.
- Operational Costs totalled R6,181,730.
- Capital Expenditure amounted to R6,279,534 which included payments to collaboration partners for the purchase of freezers, microscopes, computers and compactor shelving.

The committed amount for the project period is R38,500,370.

Anticipated commitments for the project period:

By the end of the 2018/19 financial year we anticipate having finalised Collaboration Agreements with the University of KwaZulu- Natal, Port Elizabeth Museum, McGregor Museum, National Museum and KwaZulu-Natal Museum, and for milestones on these and the existing Agreements to be reached. Payments against milestones in Collaboration Agreements will amount to R16,894,465.

Contract salary costs for six Coordinating Hub staff posts and short term data cleaners and curation assistants for incorporation of orphan collections and specimen imaging will amount to R8,254,912 for the remainder of the project period.

Commitments towards MSc bursaries, postdoctoral fellow appointments and travel grants will total R4,205,745.

Contracts towards change management process, macro fungi and herpetology identifications, document scanning and imaging, and data migration will total and estimated R3,872,000.

SANBI overhead costs and operational costs and travel and subsistence for meetings and workshops is anticipated to be R5,273,248. This includes costs for the 2nd NSCF Forum, Change Management Workshops and travel to attend working group meetings.

We have accrued R1,169,906 in interest to date.

5. Financial information

A financial report for 2017/18 provided by SANBI's Finance Division and approved by the Director, Finance, is provided separately. This report forms the basis of the financial information presented below on income and expenditure.

Budget vs Expenditure:

Natural Science Collections Facility	Budget 2017/18 Financial Year	Expenditure to date (at financial year close)
Human Resources and Support Services.		
Co-ordinating Hub staff: Management: 2 (level 12, 13) Specialists: 5 (level 10/11) Administration: 1 (level 6)	R 4 692 384	R638 365
Operational Expenditure	R9 797 616	R4 681 730
Training & research support (including workshops)	R 2 740 000	R1 502 048
Fixed annual operational cost (digitisation projects, virtual museum, orphan collections)	R4 210 000	R657 908
Travel & accommodation	R 1 075 716	R735 196
Consumables for office, collections upgrades	R151 000	R6 577
SANBI overheads charge (includes rental, finance, HR, SCM support, network etc.) (10% of grant)	R1 620 900	R 1 780 000

Capital Investment	R3 310 000	R6 279 534
Webserver & networking	R1 070 000	0
Equipment: Microscopes, X-ray machine; Digital cameras, Scanners, Freezers, Cabinets and shelving; Climate control and fire suppression system	R1 980 000	R6 279 534
Workstations / laptops (for Co-ordinating Hub and digitisation projects: total x 8+2+12)	R260 000	R0
Totals for each financial year	R17 800 000	R11 599 630

Commitments:

There are several commitments at various stages of finalisation, and with various actions that are required before payments can be transferred from SANBI's accounts. Those that are pending in the next financial year are detailed in the table below.

Committed through Collaboration Agreements

Institution	Item	Amount	Status	Expected date of finalisation
Albany Museum	Computers, microscopes, cameras	850,000	Agreement signed	Mar-19
Amathole Museum	Climate control for collection storage room, freezer	1,774,000	Agreement signed	Mar-19
ARC	Cabinets, fire suppression, alarm for freezers, microscopes, renovation of collection storeroom at OVR, DNA extraction equipment	3,190,000	Agreement signed	Mar-19
East London Museum	Shelving, microscope	1,500,000	Agreement signed	Mar-19
Ditsong Museum	Cabinets, microscope	3,140,000	Agreement signed	Mar-19
Iziko Museum	X-ray, SEM,	2,701,911	Agreement signed	Mar-19
P.E. Museum	Freezer, shelving, imaging equipment	350,000	Awaiting signature	Mar-19
SAIAB	Microscopes, repair of X-ray,	2,118,554	Agreement signed	Mar-19
	Subtotal outstanding to institutions	15,624,465		

Salary costs

SANBI	Hub staff	3,180,753	Contracts signed for 3 staff and recruitment process started for Data Specialist and Administrative Assistant	Jan 18 to Mar 20
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SANBI	Incorporation of orphan collections; data cleaning projects – short term contract staff	4,873,171	Recruitment process initiated	Jul 18 to Dec 19
SANBI	Acting allowance for Director to replace NSCF Lead	200,988	6 month acting allowance	Mar 18 to Sep 18
Subtotal		8,254,912		

Committed bursary and travel grants

SANBI	MSc Bursaries	345,745	Awarded	Mar-18
SANBI	Postdoc appointments	3,150,000	Awarded	Apr-18
SANBI	Travel grants national and international, including attendance of 2 International Conferences by hub staff	710,000	Grants advertised	May-18
Subtotal		4,205,745		

Contract commitments

SANBI	Change Management Contract	172,000	Contract signed, work underway	30-Jun-18
SANBI	DNA extraction lab refurbishment	500,000	Contract awarded	30 Sept 18
SANBI	Macro fungi identification	500,000	Tender being advertised	30-Sep-18
SANBI	Herpetology identification	300,000	Specifications to be drafted	30-Sep-18
SANBI	Document scanning for virtual museum	400,000	Specifications to be drafted	30-Sep-18
SANBI	Imaging of specimens	500,000	Specifications to be drafted	30-Sep-18
SANBI	Data migration to Specify software	500,000	Specifications to be drafted	30-Sep-18
SANBI	Change management evaluator and consultants contract	1,000,000	Specifications to be drafted	31-Jul-18
Subtotal		3,872,000		

SANBI overhead and operational costs

SANBI	SANBI administration fee	1,880,000	Upon receipt of 3 rd grant	30-Apr-18
NSCF	Operational costs and computer equipment	604,797		31-Mar-19
NSCF	Workshop and travel costs (including 2 nd NSCF Forum)	2,788,451		31-Mar-19
Subtotal		5,273,248		

Collaboration Agreements – pending

UKZN-Bews Herbarium	Freezer	70,000	Draft agreement,	Mar-19
KZN Museum	Freezer, microscope, extractor	600,000	Draft agreement,	Mar-19

National Museum	DNA extraction equipment, freezer, microscope, cabinets	500,000	Agreement being negotiated	Mar-19
McGregor Museum	Freezer, consumables	100,000	Agreement being negotiated	Mar-19
	Subtotal	1,270,000		

Total commitments: R38,500,370

TOTAL income for the project period	R51,600,000
TOTAL expenditure for the project period	R13,099,630
TOTAL projected commitments for the project period	R38,500,370
Projected balance, including contractual commitments at project period end	R0

6. Summary and assessment

Construction of Co-ordinating Hub offices and DNA extraction facility:

The design and specifications for the NSCF Co-ordinating Hub offices at SANBI were finalised and the tender was advertised and the contract awarded. The cost is estimated at R7.8 million and this will be covered by SANBI from its infrastructure budget. The building will house the Co-ordinating Hub staff, have a meeting / training area and an exhibit area. The overall space is 427m². A site near the service entrance to the Pretoria National Botanical Gardens has been identified for construction of the building and an Environmental Impact Assessment will be required before construction can commence. The anticipated completion was the end of 2018, however commencement of construction has been delayed by six months. Renovation of a laboratory at the National Herbarium to establish a DNA extraction facility for South African plants forms part of the same tender but the cost of this will be covered by the NSCF budget. The cost is estimated at R500,000.

Governance and Advisory structures:

A document outlining the governance structures and terms of reference for each of these has been developed, and reviewed by several stakeholders.

The Co-ordinating Committee has been established and met in May, and October 2017. The meetings reviewed the objectives, activities and targets, and the principles for budget allocations and the actual allocations. The next meeting is scheduled for 8 May 2018.

The membership of the five Working Groups has been finalised, Terms of Reference for members have been developed and the Data Working Group held its third meeting in March 2018. The Curation Working Group is set to meet in April 2018. Appointment letters for Working Group members have been drafted.

An internal SANBI Project Committee which includes representatives from Finance, Supply Chain Management and Human Resources has been established.

Agreements:

Collaboration Agreements with seven institutions were finalised and signed: Albany Museum, Amathole Museum, Agricultural Research Council, East London Museum, Ditsong National Museum of Natural History, Iziko Museum and the South African Institute for Aquatic Biodiversity (SAIAB). The Agreement with the Port Elizabeth Museum is awaiting signature by their senior management. Additional Agreements have been drafted with University of KwaZulu-Natal for the Bews Herbarium and KwaZulu-Natal Museum. Negotiations with the National Museum (Bloemfontein) and McGregor Museum for developing collaboration agreements are underway. Agreements are still to be developed with the Durban Natural Science Museum, UCT's Bolus Herbarium, and WITS for the Evolutionary Studies Institute and the Moss Herbarium, but no funds will be transferred to these institutions and the Agreements will only define the requirements for participation in the NSCF.

A Collaboration Agreement with the University of Kansas for the use of Specify software and capacity development is being discussed. After discussion with the head of the International Barcode of Life (IBOL), a proposal for a MoU and membership has been submitted to SANBI's structures for approval. There are several joint projects involving DNA barcoding and collections that have been discussed.

Increasing research and capacity

Calls for awarding MSc bursaries for students working on collections, for staff attending an international conference relevant to curation / collection management, visiting scientists to work on collections and postdoctoral grants have been developed and circulated. The MSc bursaries were awarded based on a scoring process that considered equity, relevance of project and motivation. Agreements with the four students have been signed and their progress is being monitored.

The award of five postdoctoral grants is currently being finalised. An open call was distributed and 21 applications received. Five women scientists, of which four are South Africans and one is a permanent resident, have been selected. The recipients will be based in collection institutions where, in addition to research on the materials, they will contribute to improvement of the specimen data and capacity development and with establishing DNA facilities.

A workshop was held with WWF to develop a strategy for capacity development for taxonomists since this has been identified as a scarce skill by several studies. An assessment of the existing capacity and retirements over the next five years and the priority fields has been developed. The funding for implementing the strategy will need to be sourced. We are also working with researchers from the Natural History Museum in London on a proposal for research and capacity development involving museums. International funds for this project are being investigated.

Promoting the NSCF and internal communication:

In order to promote the NSCF and its objectives amongst all staff, presentations were made by M. Hamer to most of the institutions. This gave staff an opportunity to ask questions and make suggestions. The NSCF was also promoted through presentations at the Zoological Society / Entomological Society Conference in July 2017, the FBIP-Biodiversity Information Management Forum in August 2017, and at the international Society for the Preservation of Natural History Collections in Denver, Colorado in June 2017 by Dr Zipfel, Curator of the Palaeontology Collection at WITS. A short article on the NSCF was published in *Thola*, the Durban Natural Science Museum magazine, in the online Business Day, in the inflight magazine *Indwe* and in *Veld and Flora*. Five radio interviews related to the launch and Forum were done by various stakeholders / staff.



DUSTING OFF SOUTH AFRICA'S NATURAL SCIENCE COLLECTIONS ...

The field of natural science without 'natural science collections' is very much like a human being without a back-bone.

The Natural Science Collections Facility or NSCF is one of 13 projects being implemented by the Department of Science & Technology as part of the South African Research Infrastructure Roadmap. Because South Africa is a "megadiverse" country, its biodiversity is of great scientific interest and the natural science collections are considered as important research infrastructure both nationally and internationally. These collections are housed in vast storerooms out of the public eye, and their value is largely unknown beyond the pool of researchers who work on and care for them.

South Africa's more than 100 000 species, many of which play an important role in ecosystems that sustain life, or that have economic, food security or health benefits. The collections enable the identification of biological material, including agricultural pests and disease vectors, and the collection data are critical for informing decisions about areas that are important for conservation, and for understanding past and future global change impacts on biodiversity. Modern technologies are creating exciting opportunities for innovative research using the collections and data.

The NSCF is a network of museums, universities and research institutes across South Africa that together hold more than 30 million preserved specimens such as animal skins, skeletons, pinned insects, birds' eggs, snail shells, dried plants, tissue and DNA samples and fossils collected over almost 200 years and covering 500 million years of life. These specimens represent

The NSCF is coordinated by SANBI and the network of institutions is working towards achieving a common set of objectives that include research that is relevant to society, providing access to data and using the collections for education and citizen science projects to promote understanding of South Africa's biodiversity assets.

Image © SANBI & Loko Museum



Department of
Science and Technology
REPUBLIC OF SOUTH AFRICA



SANBI
South African National Biodiversity Institute

Article published in Indwe magazine.

The NSCF was launched at the NSCF Forum which was held from 17-20 October 2017 in the KwaZulu-Natal Drakensberg. In total, 153 people from 26 institutions participated. Each institution gave a presentation on their collections and institution, and various break away groups met to discuss a range of issues related to the NSCF objectives. Each group reported back on the outcomes. Details of the Forum programme and the presentations are available on the NSCF website.



Participants at the NSCF Forum, October 2017

The NSCF website was developed and launched in October 2017. The website includes information on the NSCF strategy and plan, reports, details of the collections, publications and news about events and research findings.

An inner web for facilitating communication amongst all staff at participating institutions and for co-ordinating documents that are being developed and worked on by the Working Groups and for input for monitoring outputs has been developed.

A logo and branding for the NSCF has been developed, but how this is used in conjunction with SANBI's and DST's branding and for the SARIR still needs to be established.



NSCF Logo

Monitoring system:

An online monitoring system for co-ordinating outputs from the participating institutions has been developed, and is accessible to institutions. Thirteen institutions submitted reports online during the last quarter. For the 2017/18 year institutions reported a total of 153 new species described; 53,991 new specimens accessioned into the collections; 1,144,455 specimens identified for external stakeholders, 126 papers published based on the collections; 47,695 specimens imaged; 72,838 data records provided to external users and 114 outreach activities held. These figures illustrate the extensive use of the collections and associated services, and the high number of outputs.

Challenges:

A major challenge has been recruiting staff for the NSCF. The Project Manager, Data Working Group Coordinator and Curation Working Group Coordinator posts have been filled after a lengthy recruitment process. The Outreach and Marketing Working Group Coordinator post was advertised and offered to an applicant, but she refused the criminal check and so could not be appointed. The NSCF Lead position was proposed as a secondment of the NSCF Champion (the Director for Biosystematics Research & Collections Initiatives), but SANBI's Board recommended that a new contract Director post be established to carry out the SANBI responsibilities of the NSCF Champion. After challenges with recruiting a contract Director, SANBI has appointed the Deputy Director to act as Director for a period of six months, from 1 March to 31 August 2018. This has been a protracted process, and has meant that the Director had to carry the NSCF management work on top of her SANBI responsibilities for 11 months. The plans for the post after August 2018 are unknown.

Procurement of large capital items by the participating institutions has been slow, but is underway and some of the institutions have finalised processes for items such as freezers, cabinets, compactor shelving, and microscopes.



Freezers purchased by SAIAB

The Council for Geosciences has not attended meetings or participated in any of the activities and this may be related to a new staff member who is responsible for the collections, and this matter may have to be taken up with more senior management.

There are leadership problems at three of the four museums falling under the national Department of Arts & Culture. The Director of the National Museum in Bloemfontein was suspended in March 2017, and he eventually resigned in November. A new Director has been appointed from April 2018. The Ditsong National Museum of Natural History finally appointed a Director on a five-year contract in July 2017 but he resigned in November 2017 and there is currently an acting Director. The Ditsong Natural History Museum falls under the broader Ditsong Museums body, and the CEO of this structure resigned in August 2017, and was replaced the following month but the new CEO resigned from the end of March 2018. The Director of the Iziko Museum will be taking early retirement from the end of June 2018. This instability in senior management at these three institutions indicates a variety of problems at higher levels of governance. The Curator of the Bolus Herbarium at UCT has also taken early retirement.

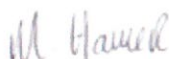
The four national museums are undergoing full documentation of their collections as part of the Generally Recognised Accounting Practice (GRAP) 103 that is applicable to Public Entities in the Arts, Culture and Heritage sector. While this process is useful, it is being carried out by audit consulting companies with no experience of natural science collections or knowledge of the practices associated with them. This has been very disruptive for the staff and in terms of access to the collections and has put some of the material at risk.

While the managers of the participating institutions have indicated strong support for the NSCF, establishing an effective network of 16 institutions with very different governance, cultures and histories is a major challenge. A contract has been awarded to consultants who specialise in complex organisational design and development in a South African context to assist with this challenge. The process aims to improve leadership, morale, engagement, diversity and performance at the institutions – which were all issues identified in the NRF report of

2011. There is also a need to re-contextualise research and public engagement associated with the collections. The first session was held in the Eastern Cape from 26 February to 2 March 2018, and was attended by 23 managers from 10 institutions and the co-ordinating hub staff. The workshop dealt with complex systems, communication, social justice, and science in an African context. Overall the feedback from participants was very positive. The next leadership session will take place in KwaZulu-Natal from 9 to 11 May 2018. The realisation is that establishing a robust network and changing the way people work and interact is an intensive process that will take time and investment. We believe that expertise in this area will be essential for the success of the NSCF and a longer term contract will be required. It will also be important to include an evaluator for assessing and documenting the change process which will also assist other institutions and networks dealing with similar challenges.

7. Approval

Approved by:



Prof Michelle Hamer
Director, Biosystematics Research & Collections Initiatives
Date: 3 April 2018



Prof Ramagwai Sebola
Chief Director, Biosystematics & Research Collections Division
Date: 3 April 2018