

Natural Science Collections Facility

Report to the Department of Science & Innovation

1 April 2021 – 30 September 2021



science & innovation

Department:
Science and Innovation
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 Co-ordinating 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 DSI. The individual institutions 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 deliverables, outputs, outcomes and impacts

Deliverables specified in the Addendum to the Agreement between Department of Science & Innovation and SANBI for the NSCF from 2019/20 to 2021/22, with anticipated changes in deliverables resulting from a reduced allocation of 2020/21 and the impacts of the Covid-19 pandemic and lockdown (highlighted in yellow).

Deliverables	Outputs	Outcomes	Impact
<p>Production of a manual for the management and conservation of natural science collections, that includes guidelines, standards and procedures (workflows) covering accessioning, preserving and storing, using, and deaccessioning, as well as data management, ethics and compliance requirements for all the different types of collections.</p> <p>Monitoring and assessment system developed for natural science collection management and conservation to determine status and risks.</p> <p>Report on the status of natural science collections, including risks and required resources and interventions, based on assessment using the system developed, and using the 2009/10 assessment as the baseline.</p> <p>Rescue of three orphan and at risk collections and movement into secure environments, based on the assessment report.</p>	<p>Well managed, accessible and secured collections of biological specimens</p>	<p>Increased research and education outputs in a range of fields, by national and international scientists</p>	<p>Increased knowledge of South Africa's past and present biodiversity for the benefit of all of society;</p> <p>International recognition for SA collections</p>

Reduced from six to three			
<p>Development of a curriculum for training in collection management and conservation procedures and standards, and implementation of short courses for staff and postgraduate students</p> <p>Training in collection data management at three levels, with courses at first two levels implemented</p> <p>At least three international conferences on natural science collection and data management attended by a total of six staff in order to increase expertise in these fields Reduced number of conferences and participants. However, virtual conferences will allow more participation by NSCF staff.</p> <p>NSCF Forum to bring all staff together to strengthen the network and share knowledge and experience.</p> <p>This was planned for October 2020, but a physical Forum will not be feasible. We will consider virtual approaches for engagement of the NSCF community.</p>	<p>Collection based staff and postgraduate students upskilled</p>	<p>Upskilled and qualified collections-based staff; greater effectiveness and efficiency in curation and management of collections</p>	<p>Skilled and qualified staff; motivated staff; secured collections used globally by scientists to address critical issues related to biodiversity</p>
<p>Increasing access to collections by experts through provision of travel grants, which also adds value to collections (10 grants awarded)</p>	<p>Integrated and openly accessible specimen data sets, including images of specimens used by researchers, postgraduate students,</p>	<p>Increased research and education outputs in a range of fields</p>	<p>Sustainable development , protection and use of biodiversity;</p>

<p>Reduced number of grants awarded, and only if travel restrictions are lifted in 2021.</p> <p>Expansion of the virtual museum to include type specimen images (6000 total), specimen data (1.2 million records total) and archival documents (100 total) for additional plant, animal and fossil groups</p> <p>Some targets have been reduced because the NSCF photographers and the assistants scanning the herbarium sheets are unable to access the collections because of extended lockdown.</p> <p>Monitoring the use of the collections nationally and globally (number of visitors, loans, data use) with input into Annual Reports</p> <p>The use of the collections will be reduced because of reduced number of visitors and loans of specimens sent out.</p>	<p>undergraduates and learners globally, and nationally by EIA practitioners, threatened species experts, and conservation authorities.</p> <p>Provision of data for Red Listing of priority groups of organisms (freshwater invertebrates, pollinators, dung beetles in next three years) to assess threat of species extinctions</p>	<p>Inclusion of wide range of species in impact assessments and decision-making in development applications</p> <p>Information provided for National Biodiversity Assessment</p>	<p>Involvement of broader society in decision-making</p>
<p>Collections used as a reference for the identification of biological materials: 500 agriculturally relevant species and 1000 illegally harvested and traded species DNA barcoded and added to Barcode of Life reference database</p>	<p>DNA barcode reference library expanded for use by a range of stakeholders</p>	<p>Improved decision-making related to pest and disease control for crops (which pest management strategy to implement or pesticide to use), which impacts on farmers at all scales (subsistence to large scale commercial), and the Department of Agriculture in the case of national risks.</p> <p>This service also supports biosecurity agents making decisions about imports and exports – whether to authorize, or to request quarantine, or other treatment, (fruit,</p>	<p>Increased food security and economic benefits from trade in agricultural products; reduced loss of biodiversity and revenue from legal trade in biodiversity</p>

		<p>vegetable, horticultural products) which impacts on food security and the economy.</p> <p>Trade in indigenous species: investigations and prosecutions need accurate identifications for illegally harvested and traded plants and animals. Illegal trade poses a risk to South Africa's unique biodiversity, and results in loss in revenue for legal breeders and traders (eg. indigenous plant breeders,</p>	
<p>Production of a report on use and impacts of collections, data and research</p> <p>Assessment of iconic specimens in collections to highlight heritage value of natural science collections</p> <p>Development and distribution of a range of materials for various audiences that highlight the value and use of the collections for addressing challenges in society</p>	<p>Material / curriculum guidelines based on outcome of research into collection value for the public displays at museums, and for museum education programmes</p> <p>Material to illustrate how scientists use the collections to solve societal and economic problems, and to highlight iconic specimens</p>	<p>Improved public understanding of biodiversity, its importance for human well-being and for national and cultural identity</p> <p>Society participates in and contributes to collection and biodiversity related activities</p> <p>Cross cultural appreciation for varied values for species</p> <p>Policy decisions that recognise the value of collections so that they are protected for future generations</p> <p>Improved understanding of biodiversity and related research and discovery by school learners; inspired learners</p>	<p>Biodiversity and collections viewed as national assets and treasures; social cohesion; increased interest in life sciences by learners</p>
<p>Transformation process to strengthen leadership and the network and to recontextualise the collections and associated science: report on transformation journey</p>	<p>Increased leadership capacity and capability in collection institutions</p> <p>Increased buy-in and support for NSCF amongst staff at collection institutions</p>	<p>Secured collections, with increased efficiencies and productivity</p> <p>Novel science and interpretation / displays based on indigenous knowledge systems</p>	<p>Sustainable institutions and network; accessibility of information from collections to a wide range of South Africa's population</p>

<p>produced to assist other programmes</p> <p>Regular and effective communication between the NSCF Hub, governance structures and Working Groups and all staff to strengthen the network and increase sharing of knowledge and experience. Eg. Website, Facebook page, webinars.</p>	<p>Increased appreciation for diversity, inclusivity and the African context of the collections and associated science</p> <p>Increased collaboration and sharing of resources across institutions</p>	<p>Other initiatives involving the development of networks of institutions able to learn from the experience of the NSCF</p>	
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Summary of changes in deliverables:

- Reduced number of orphan collections integrated from 5 to 3.
- Reduced number of type specimens photographed in 2020/21 from 3000 to 1000.
- 100 archival documents related to collections digitized – removed from 2020/21.
- Reduced outputs from use of collections for research and capacity development (2020/21 and 2021/22)
 - 100 publications produced by researchers using collections (reduced from 500)
 - 80 new species described from the collections (reduced from 120)
 - 100 scientists visiting the collections for research purposes (reduced from 500)
 - 3000 specimens sent out on loan to researchers (reduced from 10 000)
 - 20 MSc, PhD and Postdocs using collections for their research (reduced from 25)
- Number of agriculturally important species barcoded reduced from 1000 to 500 in 2020/21.
- 2020/21 and 2021/22: Training in use of Specify software for data management – removed
- 2020/21: Training courses in collection management and curation for institution staff, postgraduate and undergraduate students: number of participants reduced from 80 to 30.
- 2020/21: international conference attendance: conferences either cancelled or held virtually, in which case a number of staff will observe presentations or present.
- 2020/21: Online/ virtual NSCF Forum for all staff from 16 participating institutions rather than physical Forum with about 160 participants.
- 2020/21: Remove promotion of the NSCF and collections at professional society conferences to increase use of collections and data for research (minimum of 2 / year).

Duration of the contract

The NSCF falls within the South African Research Infrastructure Roadmap (SARIR) programme of the Department of Science & Innovation. The South African National Biodiversity Institute (SANBI) has been contracted by the DSI to co-ordinate the implementation of the NSCF. The initial contract between SANBI and the DSI was from 24 February 2017 to 31 March 2020, but this was extended to July 2021 to accommodate SANBI's co-ordination of a second SARIR project, the Biodiversity Biobanks. The next three-year contract was signed in March 2020, with an allocated budget of R59 million. This amount has been reduced in response to government's request that budgets are revised and all possible funds are directed to the Solidarity Fund to fight Covid-19 in South Africa. This has impacted on the 2020/21 allocation only which has been reduced from the original amount of R19 980 012 to R6 439 157. This reduction is possible through cutting travel funds and the costs of the NSCF Forum.

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 the following overall goals:

1. Estimated 18-20 million preserved plant, animal, fungi and fossil specimens collected over the last 200 years, well curated, and accessible either virtually or physically to the global research community for research in biological, environmental and palaeo- sciences, for contributing to **documenting past and present biodiversity, understanding global change impacts on species and biological communities, and possible mitigation and adaptation mechanisms**. There are a large number of curation and collection management challenges, including the absence of common standards and processes and training for those staff who are responsible for caring for the collections and providing access to these through loans or subsampling or facilitating visits by researchers. This objective will be addressed in the next three years by compiling the documents that have been developed in the first phase into a manual, assessing the collections against the standards set, developing curriculum and initiating a training programme for curation staff.

2. The data from the specimens (what it is, where it was collected, when it was collected as a basic minimum) assembled into **databases that are openly accessible in an integrated way for researchers, practitioners involved in monitoring and assessing the status of biodiversity (eg. threatened species assessments, alien invasive species risk assessments, environmental impact assessments for various forms of land use change and development), and decision-makers involved in authorisations for land use change (eg. mining, agriculture), development, and harvesting quotas (eg. medicinal plants, fish)**. The data are currently incomplete, with a large number of undigitised specimens and gaps in the information for records, managed in several different, often inappropriate software, and with a diversity of formats which makes integration across collections and institutions problematic. This objective therefore involves migration to common collection management software (Specify), expansion to include all specimens, and upgrading which involves verification of specimen identity, reformatting and addressing gaps, as well as submission to the Global Biodiversity Facility (GBIF), an open access global repository, as well as the NSCF Virtual Museum.

3. **Establishment of a Virtual Museum that provides online access to images of specimens from the collections of all participating institutions, specimen data sets and archival documents** such as field notes of historic collectors. Researchers, postgraduate students, EIA practitioners, threatened species and alien invasive species assessors, conservation authorities, and learners will be able to access the virtual museum for a range of projects.

4. Provision of **services and development and application of tools for the accurate identification of biological specimens and materials for a range of stakeholders** including the research community, enforcement agencies investigating illegal trade in wildlife, agencies dealing with biosecurity and eradication programmes, veterinary and medical practitioners, EIA consultants, farmers, and bioprospectors. Accurate identification of species is often challenging, especially for groups with very high levels of diversity (eg. 18 000 beetle species, 24 000 plant species in South Africa), or where only partial samples are available (eg. blood, bone, horn, bark, dried powders, meat), or where the specimen is an immature stage (eg. seeds, bulbs, bird, insect or parasite eggs, larval stages of fish or insects). Export and import of agricultural products can be blocked if there are doubts about the identity of any infestations or infections which impacts the economy and jobs. The

need for increased accuracy and speed of identifications and for addressing gaps in expertise for many groups requires the application of DNA barcoding. The reference library for DNA barcodes needs to be expanded to represent important species, and the technology adopted especially where there is potential economic or societal impact (eg. identification of material for biosecurity, illegal trade, parasite infestations for diagnostics).

5. Increase understanding of the value of natural science collections to society to (i) inform policy influencing their long term sustainability, (ii) communicate how the collections contribute to sustainable development and understanding of climate change to learners and the public, and (iii) promote social cohesion. **The unique and valuable national assets in the form of the natural science collections have not been promoted nationally, and there is little awareness or understanding of their significance, which means that they are often at risk of being neglected or discarded. The NSCF will document case studies of use of the collections by the research, practitioner and decision-making communities to solve problems of national and global relevance.** Using the outcomes of the research, materials will be developed that communicate the findings to a range of audiences, and guidelines for museum education programmes that involve the collections and associated research outputs will be developed to increase the impact of these programmes. The information presented must be audience specific, relevant to the African context, promote indigenous knowledge systems and contribute to public understanding of science and social cohesion. The outcome of this goal will have relevance beyond South Africa because many countries face similar challenges related to the sustainability of natural science collections, and they run museum education programmes.

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

- Transforming the current fragmented natural science collections landscape to one with participatory planning, and collaborative implementation, monitoring and reporting processes and systems, and one that reflects its African and South African context.
- Ensuring that appropriate capacity to curate collections, manage data and research the collections is available and well qualified staff are retained.
- Contributing to the identification of strategies and models that will ensure financial sustainability of the natural science collections.

In the first three years of the NSCF implementation a large focus was on the establishment of the structures and initiating their functioning, and strengthening the network to ensure true collaborative planning, implementation and reporting. There have been investments in upgrading research equipment at institutions, as well as storage environments for collections, integrating orphan collections, digitisation of specimens, and upgrading and expanding specimen data sets as well as developing guidelines, standards and procedures. Communication between the Hub and institutions, and between institutions has been identified as a critical area of work and a website, Facebook page and newsletter have been developed. A NSCF Forum was held in October 2017, and May 2019, and a third scheduled for November 2020. All staff from participating institutions are invited to attend these events. A change management process was implemented to address the challenge of transforming the institutions from their practice of working in a fragmented, isolated way, with a range of challenges, to working as a dynamic and effective network with real collaboration and innovative ways of addressing challenges. This intervention has highlighted the need for a longer term process.

In the next three years several of the activities initiated will be continued, but the investment is more focussed on producing tangible outputs that will have impact and contribute to society and challenges, and to national agendas.

3. Progress: 1 April 2021 – 30 September 2021

STRATEGIC OBJECTIVE	3 YEAR DELIVERABLES (2019/2020 to 2021/22)	PROGRESS APRIL 2021 TO SEPTEMBER 2021
<p>1. Securing collections – ensuring collections meet global standards</p>	<p><u>2019/20</u></p> <ul style="list-style-type: none"> • Compile a Collection Management and Curation Manual for natural science collections that includes guidelines, standards and procedures, ethics and compliance requirements, for distribution to participating and other institutions. <p><u>2020/21</u></p> <ul style="list-style-type: none"> • Assess and report on the status of collection management and curation of the collections in terms of implementation of the standards and policies. • Address critical risks to collections identified in the assessment through allocation of funds for upgrading, or consider moving at risk collections. <p><u>2021/22</u></p> <ul style="list-style-type: none"> • Report on status of collections provided to governance structures of collection institutions for attention / action / decisions. • Based on the assessment of curation standards of collections, identification of 3 orphan collections at risk, and movement of these to secure institutions. 	<ul style="list-style-type: none"> • NSCF Collections Management Course launched and 75 collections staff enrolled in course. Course consists of a series of webinars, discussion forums, tutorials and linked assignments run by NSCF Hub team to assist institutions with implementation of the standards and processes as set out in the Collection Management & Conservation Manual. Sessions covering collections ethics, documentation of collections activities and risk and disaster management were held. • Current orphan collections being incorporated: Ward and Nicholson-Abbott Herbaria into Bews Herbarium (UKZN); Albany fish collection into SAIAB collection. • Planned move of collections: Buffelskloof Herbarium to Moss Herbarium, Wits University. • Funding for the upgrade of research infrastructure, collection care items and research equipment allocated to 16 partner institutions. 15 Collaboration agreements signed for the 2nd phase of the project. Funds were also allocated to SANBI's 3 herbaria. Institutions continued to procure collection care items against year 3 allocations in order to comply with the standards as set out in the Collection Management and Curation Manual. Funds that were not spent from year 1 and 2 allocations were redistributed to institutions following the NSCF funding framework and approved by the funding panel. Items that were procured during this reporting period include: metal specimen cabinets, collection care consumables, sealing of windows in collection areas for climate control purposes, dehumidifiers, storage trays for specimen slides, 3D scanner.
<p>2. Upgrading and expanding collection specimen databases, and making these openly accessible in an integrated way for research, biodiversity assessment and decision-making</p>	<p><u>2019/20</u></p> <ul style="list-style-type: none"> • 100 000 specimen records captured or upgraded (vertebrates, 3 plant families) • Membership of international consortium for Specify software signed. This promotes collaborative research into data management for collections. • Migration of 70% of collections to Specify software, which contributes to meeting GRAP 103 standards for heritage collections accounting. <p><u>2020/21</u></p> <ul style="list-style-type: none"> • 100 000 specimen records captured or upgraded (selected invertebrates – for Threatened Species Assessment (see point 5 below), 3 new plant families). 	<ul style="list-style-type: none"> • 9 580 herbarium specimen records were captured from April to September. • 7 500 herbarium specimen records georeferenced • Migration of collections to Specify for Albany Museum palaeontology and ARC OVR helminths underway and almost complete. • Incorporation of herpetology collection at Durban Museum underway, for approximately 4000 specimens, with estimated completion in December. • Data cleaning for Ditsong herpetology collection underway but held up due to lack of necessary collection care consumable at the institution. • Development and improvement of georeferencing software tool has been ongoing.

	<ul style="list-style-type: none"> Data submitted to and made accessible through GBIF. <p><u>2021/22</u></p> <ul style="list-style-type: none"> 100 000 specimen records captured / upgraded (selected invertebrates – for Threatened Species Assessment (see point 5 below), 3 plant families). Data submitted to and made accessible through GBIF. 	
<p>3. Developing an online and accessible Virtual Museum, with images of the type specimens, specimen data and archival documents that can be used by researchers, postgraduate students, undergraduates and learners globally, and nationally by EIA practitioners, threatened species experts, and conservation authorities.</p>	<p><u>2019/20</u></p> <ul style="list-style-type: none"> Imaging of type specimens for Virtual Museum: 1000 specimens imaged (vertebrates, 3 plant families, Karoo fossils). <p><u>2020/21</u></p> <ul style="list-style-type: none"> 1000 type specimens imaged (selected invertebrates, Karoo fossils) for the virtual museum. Online virtual museum architecture set up and content uploaded. <p><u>2021/22</u></p> <ul style="list-style-type: none"> 100 archival documents related to collections digitized. 4000 type specimens imaged (selected invertebrates, Karoo fossils) for the virtual museum. Uploading of all new images and data and archival documents onto virtual museum. Extent, purpose and impacts of use of virtual museum documented and reported on. 	<ul style="list-style-type: none"> Imaging of Evolutionary Studies Institute palaeontology has continued, with completion imminent with approximately 170 specimens in total Imaging of Ditsong mammals has continued, with skins for approximately 70 specimens completed, and skull imaging commenced. Institutions reported a further 58,744 specimens imaged from April to September 2021. Procurement of hosting services for Virtual Museum planned for the next quarter.
<p>4. Global use of collections for research and capacity development</p>	<p><u>2019/20</u></p> <ul style="list-style-type: none"> 150 publications produced by researchers using collections 120 new species described from the collections 500 scientists visiting the collections for research purposes 10 000 specimens sent out on loan to researchers 25 MSc, PhD and Postdocs using collections for their research <p><u>2020/21 & 2021/22</u></p> <ul style="list-style-type: none"> 100 publications produced by researchers using collections 80 new species described from the collections 100 scientists visiting the collections for research purposes 3000 specimens sent out on loan to researchers 20 MSc, PhD and Postdocs using collections for their research 	<p><u>2019/20 (April 2019 to March 2020):</u></p> <ul style="list-style-type: none"> 201 publications produced 250 new species described 1 770 national visitors and 275 international visitors using the collections 22 049 specimens sent out on loan 449 postgraduate students using the collections <p><u>2020/21 (April 2020 to March 2021):</u></p> <ul style="list-style-type: none"> 252 publications produced 235 new species described 298 national visitors and 66 international visitors using the collections 6 523 specimens sent out on loan 64 postgraduate students using the collections <p><u>2021/22 (April 2021 to September 2021):</u></p> <ul style="list-style-type: none"> 107 publications produced 73 new species described 338 national visitors and 14 international visitors using the collections 5 796 specimens sent out on loan 150 postgraduate students using the collections

		<p>*the total number of postgraduate students, local and international visitors may be inflated because the same student or visitor may have been counted each year because they used the collections more than once in separate years</p>
<p>5. Translational research / services outputs (societal impacts)</p>	<p>Over 10 000 biological specimens identified per year, including, but not limited to the following sectors:</p> <p>Agriculture:</p> <ul style="list-style-type: none"> • decision-making related to pest and disease control for crops and livestock (which management strategy to implement or treatment or pesticide to use), which impacts on farmers at all scales (subsistence to large scale commercial), and the Department of Agriculture in the case of national risks. <p>This service also supports biosecurity agents making decisions about imports and exports – whether to authorize, or to request quarantine, or other treatment, (fruit, vegetable, horticultural products) which impacts on food security and the economy.</p> <ul style="list-style-type: none"> • Conservation / sustainable use of natural resources: identification of material to determine conservation status; investigations of harvested and traded materials (traditional medicine, fishing, wildlife poaching, export, import). <p>Investigations and prosecutions need accurate identifications for illegally harvested and traded plants and animals. Illegal trade poses a risk to South Africa's unique biodiversity, and results in loss in revenue for legal breeders and traders (eg. indigenous plant breeders, wildlife breeders), as well as in tax revenue.</p> <p>Consultants: EIAs for land use change: identifications from surveys for inclusion in reports.</p> <p>Adoption of new technologies for identification of biological material to improve accuracy and address capacity / knowledge constraints (DNA barcoding)</p> <ul style="list-style-type: none"> • Signing of Agreement with International Barcode of Life (IBOL) for collaboration. • Course run on DNA barcoding of natural science collections by IBOL and University of Johannesburg. At least 10 collections staff attend. 	<ul style="list-style-type: none"> • 2019/20: 22 464 specimens identified • 2020/21: 46 845 specimens identified. • <u>April to September 2021: 7 819 specimens identified</u> • Purpose of identifications include: farming diagnostics, disease management, pest management, biological management, conservation management and planning, research, commercial crop production, barcoding, law enforcement, quarantine services, public health, post mortem examination, public interest, export certification purposes and horticulture. • Clients include: University of Rwanda, Rhodes University, Kroonstad Provincial Vet Lab, Pongola Animal Clinic, Ezemvelo KZN Wildlife, City of Cape Town Health Department, Plettenberg Bay Stranding Response, National Sea Rescue Institute, Mpumalanga Parks Board, DEA, DAFF, State Veterinarian Vryburg and Skukuza, eThekweni Municipality, SANPARKS, SAEON, Victoria Falls Wildlife Trust, Ministry of Agriculture Namibia, BirdLife South Africa, St Andrews College, Nelson Mandela Bay University, National Sea Rescue Institute, Blue Water Bay Community Police, University of Pretoria, Tshwane University of Technology, KEW Millennium Seed Bank, French Agricultural Research Centre for International Development. <ul style="list-style-type: none"> • Framework document developed and circulated. Workshop held. • List of target pest, pathogen and disease vector species drawn up. • Specifications for DNA barcoding work required developed.

	<ul style="list-style-type: none"> • Development of plan for DNA barcoding of collection specimens to develop the DNA barcode reference library. <u>2020/21</u> • 500 agriculturally relevant species DNA barcoded and added to Barcode of Life reference database for use by the Agricultural Research Council for diagnostics for farmers and biosecurity agents. <u>2021/22</u> • 1000 traded indigenous species added to the DNA barcode reference library (eg. cycads, fish, reptiles) for use by enforcement and prosecuting agents. • Promotion of adoption of DNA barcoding technology by staff involved in diagnostics and biosecurity, and by enforcement agents for illegal trade and harvesting. 	
	<p>Spatial planning and decision-making for development:</p> <p><u>2019/20</u></p> <ul style="list-style-type: none"> • Plan developed with SANBI's Threatened Species Programme, for assessing threat status of ecologically / economically important biodiversity. <p>Assessments are included in the National Biodiversity Assessment, and the Department of Environment's land use decision-making tool, and Marine Information Management System. These are used by conservation authorities and the national Department to make decisions on development applications (eg. infrastructure such as mining, housing, roads). Delays in accessing data can result in lost revenue, while poor decisions can result in loss of biodiversity.</p> <p><u>2020/21</u></p> <ul style="list-style-type: none"> • Surveys, taxonomic research and data capture for animal groups targeted for assessment: <ul style="list-style-type: none"> (i) pollinator flies which play a role in crop and wildflower pollination, (ii) dung beetles which are important for waste recycling and soil fertility (removal and breakdown of livestock dung) (iii) freshwater invertebrates, which are impacted by water quality and climate change. <p><u>2021/22</u></p> <ul style="list-style-type: none"> • Promotion of specimen datasets amongst national and provincial conservation authorities, municipalities 	<ul style="list-style-type: none"> • Focus taxa identified - freshwater, terrestrial, marine

	<p>and consultants for use in impact assessments and decision-making in development applications.</p> <ul style="list-style-type: none"> Data and expert input for threatened species assessments. <p>In addition to being included in spatial plans, information on the status of pollinator flies, dung beetles and fresh water invertebrates can be used to develop management plans for landowners / conservation authorities to protect not only the species but also the critical role that they play in ecosystems.</p>	
	<p><u>2019/20</u></p> <ul style="list-style-type: none"> Concept note developed for research into the use of the collections and data by the global community and its outcomes and impacts, as well as the iconic specimens protected by the collections on behalf of the South African public. This research will guide decisions about investment into maintaining and supporting collections, and will provide material for public displays and education programmes. <p><u>2020/21</u></p> <ul style="list-style-type: none"> Research Indaba for estimated 40 collections-based researchers to gather data on translational research, and to strengthen this aspect of in-house research. Compilation of data on examples of use and impacts from the SA collections and globally. Research into globally iconic specimens in South African collections and development of materials for these. This will contribute to nation building and public understanding initiatives at museums. <p><u>2021/22</u></p> <ul style="list-style-type: none"> Production of a report on use and impacts of collections, data and research that will be provided to national (Environment, Arts & Culture, Agriculture, DSI) and provincial departments and higher education institutions that govern the collections to help guide decision-making about this infrastructure. Material / curriculum guidelines based on outcome of research into collection value for the public displays at museums, and for museum education programmes. Material to illustrate how scientists use the collections to solve societal and 	<ul style="list-style-type: none"> 3rd Task team meeting held in September. Data on examples of use and impacts from SA collections submitted by researchers from partner institutions, and data gathered from literature searches on the web. Webpage developed with information on the value of natural science collections and iconic specimens and regularly updated. Showcase publication and linked webinars launched showcasing the value of natural science collections and associated research to society. 3 showcases and webinars have been published covering the contribution of collections to food security and agriculture, the fight against pests and diseases, iconic and historically important specimens. Publication platform established on Medium, publication of 13 popular articles in total relevant to the value of collections by NSCF institution staff. Held meetings with National Science & Technology Forum (NSTF) to include museum and herbaria interactive education and career information as part of online interactive education tool (STEMulator). Collaboration agreement with NSTF signed and development of natural science related content underway. Two research papers planned: surveys on broader research community perceptions of natural science collections is in progress; and analysis of research outputs from the collections over the past 10 years, with emphasis on contribution of research to Sustainable Development Goals planned for 2022.

	<p>economic problems, and to highlight iconic specimens. This addresses objectives in the DSI White Paper.</p>	
<p>6. Human resources management and capacity development</p>	<p><u>2019/20</u></p> <ul style="list-style-type: none"> • Hub and project-related staff: 16 staff (NSCF Lead, Project Manager, Administrative Officer, Science Communication Officer, Data Co-ordinator, Data Quality Specialist, Collection Management and Curation Co-ordinator, 6x Data Technicians, 2x photographers, document archivist). • Participating institutions: Approx. 20 short term contracts and internships / year for recent graduates / to develop capacity and assist with curation activities / data capture and digitisation. • Training curriculum for data management developed. • Training initiated in the use of Specify software (approximately 100 staff, postgraduates and undergraduates trained). • Curriculum development for collection management and curation training. • International conference relating to natural science collection and data management_(1-2 staff from Hub / participating institutions). <p><u>2020/21</u></p> <ul style="list-style-type: none"> • Hub and institution staff management. • Training courses in collection management and curation for institution staff, postgraduate and undergraduate students (estimated 30 participants). • International conference attendance relating to natural science collection and data management (1-2 staff from Hub / participating institutions) (online participation in Society for Preservation of Natural History Collections / International Council for Museums conference). <p><u>2021/22</u></p> <ul style="list-style-type: none"> • Hub and institution staff management. • Training courses in collection management and curation for institution staff, postgraduate and undergraduate students (estimated 80 participants) • International conference attendance relating to natural science collection and data management (3 staff from Hub / participating institutions). 	<ul style="list-style-type: none"> • Current Staffing: NSCF Lead, Project Manager, Data Management Co-ordinator, Collection Management Co-ordinator; Science Communication Officer, two Specimen Photographers, two Curation Technicians, Admin Officer, two Data Quality Specialists and five Data Technicians, HR Officer (as well as 4 curation technicians, and 1 curation assistant appointed at partner institutions to incorporate orphan collections and image backlog plant specimens). 6 Research Assistants appointed on 6 month contracts to assist with incorporating backlogs and migrating databases. • 7 hub staff and staff from participating institutions attended the virtual iDigBio conference in September. Prof Hamer presented a talk on <i>South African Natural Science Collections Data</i>. • Sponsored training in data management for 17 staff from partner institutions through University of Pretoria Enterprises was completed. • Sponsored short course in science communication for 5 staff from partner institutions through University of Stellenbosch was completed. • Selected staff from the NSCF and partner institutions are continuing training in the more advanced use of Specify software.
<p>7. Organisational development & support – strengthening the internal structures of the NSCF to enable the long-term sustainability of the collections</p>	<p><u>2019/20</u></p> <ul style="list-style-type: none"> • Leadership development: 25-35 participants in 2 workshops for development and transformation to 	<ul style="list-style-type: none"> • Consultants were appointed for a 6-month period and then for 2.5 years to run a change management, leadership and organisational development process for the NSCF. Workshops were held for institutional managers / senior scientists and the NSCF Hub Team.

<p>and associated research to benefit society</p>	<p>ensure long term sustainability of collections and NSCF.</p> <ul style="list-style-type: none"> • NSCF Forum for staff from 16 participating institutions (140 staff). • Communication platforms for the NSCF network – website, Facebook page, newsletters. • Promotion of the NSCF and collections at professional society conferences to increase use of collections and data for research (minimum of 3 / year). <p><u>2020/21</u></p> <ul style="list-style-type: none"> • Leadership development: 25-35 participants in 2 workshops for development and transformation to ensure long term sustainability of collections and NSCF. • Online / virtual NSCF Forum for all staff from 16 participating institutions. • Communication platforms for the NSCF network – website, Facebook page, newsletters. <p><u>2021/22</u></p> <ul style="list-style-type: none"> • Leadership development: 25-35 participants in 1 workshop for development and transformation to ensure long term sustainability of collections and NSCF. • Report on the transformation and organisational development journey of the NSCF which can inform other large scale projects involving multiple partners in a network arrangement. • Communication platforms for the NSCF network – website, Facebook page, newsletters. 	<p>From April to September 2021, two sessions were held for the hub team, and one session was held with the institutional managers / senior scientists. The organisational development evaluator also produced a comprehensive report in consultation with the hub team and Coordinating Committee representatives on the NSCF organisational development journey which commenced in 2017 to date.</p> <ul style="list-style-type: none"> • Website, Facebook page and group, Instagram and Twitter accounts operational, newsletter circulated every 2 weeks and webinars done regularly - value of collections webinars added. Website hits from April 2021 to September 2021: Visits: 14 561; visitors: 7 520. Facebook page likes: 653. Facebook group members: 246. Instagram followers: 166. Twitter followers: 153. Average collection management course webinar attendance: 73.4. Average collection management course discussion forum attendance: 52.8. Average value of collections webinar attendance: 43..
<p>8. Governance</p>	<p><u>2019/20</u></p> <ul style="list-style-type: none"> • Meetings of Advisory Committee (twice a year); Co-ordinating Committee (3 times a year), and four Working Groups (1-3 meetings annually each) • Develop new Collaboration Agreements with partner institutions. • Six monthly and final report to DSI; quarterly report to SANBI EXCO / Board. <p><u>2020/21</u></p> <ul style="list-style-type: none"> • Meetings of Advisory Committee (twice a year); Co-ordinating Committee (3 times a year), and four Working Groups (1-3 meetings annually each) • Develop new Collaboration Agreements with balance of partner institutions. • Six monthly and annual reports to DSI; quarterly report to SANBI EXCO/Board. <p><u>2021/22</u></p> <ul style="list-style-type: none"> • Meetings of Advisory Committee (twice a year); Co-ordinating Committee (3 times 	<ul style="list-style-type: none"> • Advisory Committee met in May 2021 and the next meeting is scheduled for November 2021. • Coordinating Committee meets monthly. • Staffing and Capacity Development Working Group meeting was held in May 2021. • Herbarium and animal data working groups meet on an ad hoc basis as needed. • Collaboration agreements were developed and signed for the 2nd phase of the project, and funding allocated to 15 institutions (Albany Museum, Amathole Museum, ARC, P.E. Museum, Ditsong Museum, Durban Natural Science Museum, East London Museum, Iziko Museum, KwaZulu-Natal Museum, McGregor Museum, National Museum, SAIAB, Bolus Herbarium UCT, Bews Herbarium UKZN, Moss Herbarium Wits). Funding for collection care items was also allocated to SANBI's 3 herbaria. Funds that were not spent from year 1 and 2 allocations were redistributed to institutions following the NSCF funding framework and approved by the funding panel.

<p>a year), and four Working Groups (1-3 meetings annually each)</p> <ol style="list-style-type: none"> 1. Six monthly and annual reports to DSI; quarterly report to SANBI EXCO/ Board. 	<ul style="list-style-type: none"> • Six monthly reports submitted to DSI, and quarterly reports submitted to SANBI (EXCO/Board).
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4. Financial analysis

Income:

The grant for the first phase of the project (2016/17 – 2018/19) amounted to R51,600,000. The grant for the first two years of the second phase of the project (2019/20 – 2021/22) was also transferred to SANBI’s bank account in March 2020 and March 2021 respectively. **The total project income to date is R77,018,169.**

Expenditure to date is R77,343,935:

- Human Resources and support services costs amounted to R27,235,610 (R26,723,803 reflected on report plus R511,807 prior year adjustments).
- Non HR Operational Costs totalled R24,673,850.
- Capital Expenditure amounted to R25,434,475 which included payments to collaboration partners for the purchase of freezers, microscopes, x-ray machine, ethanol recycler, dehumidifiers, cabinets, compactor shelving and small items for curation of collections and research.

The committed amount for the project period is R13,685,890.

Collaboration agreements were signed with 15 partner institutions in July and August 2020 and funds were allocated in the agreements for infrastructure upgrades, research equipment and collection care upgrades and small equipment. Funds that were not spent from year 1 and 2 allocations were redistributed to institutions following the NSCF funding framework and approved by the funding panel. The balance of funds allocated in existing agreements amounts to R2,867,169.

The balance of staff contracts including seventeen Coordinating Hub posts, one HR Officer and short term data technicians and curation assistants for incorporation of orphan collections and specimen imaging amount to R10,327,137.

Contracts towards change management process and website maintenance total an estimated R491,583.

We have accrued R4,476,188 in interest to date.

5. Financial information

A detailed financial report for the first phase (2016/17 to 2018/19) and second phase (2019/20 – 2021/22) of the project (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, expenditure and commitments for April to September of the financial year 2021/22.

Budget vs Expenditure:

Natural Science Collections Facility	Budget (2020/21 grant received in March 2021)	Expenditure to date (April 2021 to September 2021)
Human Resources and Support Services. Co-ordinating Hub staff: Management: 2 Specialists: 3 Data Technicians, specimen photographers and curation technicians: 11 Administration, human resources and communication : 3	R 3 374 652	R 4 814 957
Operational Expenditure	R 3 105 117	R 837 047
Training & research support (including workshops)	R 2 387 140	R 86 132
Fixed annual operational cost (digitisation projects, virtual museum, orphan collections)	(included in training & research support)	R 315 383
Travel & accommodation	R0	R 55 534
Consumables for office, collections upgrades	R 70 000	R 379 998
SANBI overheads charge (10% of grant)	R 647 977	R 0
Capital Investment	R 0	R 807 407
Webservers & networking*	R 0	R 807 407 (payments to collaborating institutions)
Equipment: Microscopes, X-ray machine; Digital cameras, Scanners, Freezers, Cabinets and shelving; Climate control and fire suppression system	R 0	(included in the 'networking' amount above)*
Workstations / laptops (for Co-ordinating Hub and digitisation projects: total x 8+2+12)	R 0	(included in 'consumables for office, collections upgrades' above)**
TOTAL	- R6 479 769	R6 459 411 <i>(99% of 2020/21 budget spent)</i>

Details of financial 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. These are commitments against signed staff contracts, collaboration agreements and service provider contracts for which the project is obliged by SANBI to keep the committed funds in the project cost centre. Commitments against actual signed contracts are detailed in the table below.

Committed through signed Collaboration Agreements – deadline for spending 31 October 2021

Institution	Balance of funds committed in collaboration agreements
Albany Museum	R 30 100.00
Agricultural Research Council PPRI & OVI	R 1 032 385.00
Bayworld/PE Museum	R 57 516.78
Durban Natural Science Museum	R 249 000.00
Iziko Museums of South Africa	R 233 217.50
KwaZulu-Natal Museum	R 99 177.89
McGregor Museum	R 62 900.00
South African Institute for Aquatic Biodiversity	R 348 222.00
SANBI National Herbarium	R 442 630.00
SANBI KwaZulu-Natal Herbarium	R 8 000.00
UKZN - Bews Herbarium	R 297 320.00
Wits - Moss Herbarium	R 6 700.00
Total	R 2 867 169.17

Salary costs (committed through staffing contracts, and required to be retained in cost centre by SANBI)

Item	Expected date of finalisation	Amount
Hub staff and short term contract staff at institutions	March 2023	R10,149,537.00
Incorporation of orphan collections; data cleaning projects – research assistants	March 2022	R177 600.00
TOTAL		R10,327,137.00

Contract commitments

Item	Expected date of finalisation	Amount
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Change management evaluator and consultants contract	October 2021	R250 990.95
Website maintenance	February 2023	R240,593.01
TOTAL		R491,583.96

Financial summary:

Project balance brought forward from 1 st phase	-R19,497,020
TOTAL Income received in 2 nd phase	-R25,418,169
TOTAL expenditure for the 2 nd phase	R45,240,954
Project Balance (without interest earned)	R325,765
TOTAL Interest earned 1st and 2nd phase	-R4,476,188
Project Balance (with interest earned)	-R4,150,422
TOTAL contract commitments	R13,685,890
Projected balance, including interest earned and contractual commitments	R9,535,468

6. Summary and assessment

Achievements:

1. **Establishing a true network of institutions that previously worked completely in isolation.** Staff now interact and engage across institutions, share knowledge and expertise, and provide support for solving problems. A transformation / change management and leadership programme has been run over the last two years to address many of the challenges dealing with a multi-institutional network, with institutions under different governance structures, with different cultures (some dating back more than 100 years), and of different sizes and levels of complexity. Three national Forums have been held for all staff from the institutions to attend in order to promote working as a network. The third Forum was held online from 23 to 26 March 2021, and 179 staff from institutions registered to attend. The theme for this year's annual forum was 'Caring and Sharing', focusing on international best practice in collection conservation, open access to collections and its associated data. Ongoing changes required in making South Africa's natural science collections openly accessible, secure and increasing understanding of their value to the public was a focal point of the four-day engagement. The unveiling of the much awaited Collection Management and Conservation Manual was a highlight of the first day. Staff also attended sessions that focused on well-being and caring for self and teams as part of the broader NSCF Organisational Development process and in response to impacts of the Covid-19 pandemic and national lockdown.

2. The **NSCF Collection Management and Conservation Manual and Course** The manual was published and hardcopies distributed to staff at institutions during February and March 2021. This was a collaborative effort, involving 16 institutions, and covers acquisitions, deaccessioning, storage and environmental standards for collections, access through loans and visits, provision of data and supply of materials for DNA analysis, data standards and management, risk assessment, health and safety, ethics and permitting guidelines. This Manual serves as a guide for institutions, as the basis of an assessment of the curation status of all collections, and for development of training programmes for collection management and curation.



A .pdf version of the Manual is also available on the NSCF website for download:

<https://nscf.org.za/resources/collections-management/>

The Collections Management Course was launched in May 2021. The NSCF Hub developed the content for the course based on the Manual and co-ordinates webinars and various other virtual forums to provide guidance and support for implementing the Manual and this offers an opportunity to develop capacity at the same time. Learning exercises are aimed at getting participants to engage with the Manual content in their actual work environment, and assessments of assignments will be carried out at the end of the course. 75 staff from partner institutions registered for the course and the first 4 webinars were held during the last 6 months. This included linked discussion forums, tutorials and assignments for the first 4 modules covering collections ethics, documentation of collection activities, risk and disaster management, and developing a disaster management plan.



A .pdf version of the Manual as well as Collection Management Course content is available on the NSCF website for download: <https://nscf.org.za/resources/collections-management/>

3. **Integrated monitoring of outputs from the use of the collections** has been carried out, and illustrates the value of the collections as research infrastructure: figures for the first 6 months of the 2021/22 financial year: 124 requests for data serviced, with 41,772 specimen records provided; 338 national visitors and 14 international visitors using the collections; 73 new species described using the collections; 107 peer-reviewed papers published where the collections were used; the number of postgraduate students who used the collection was 150 (note that the same student may be counted more than once if they used more than one institution's collections). We have recognised the need to develop an understanding of the impacts or relevance of the research carried out and the data provided and this is currently being worked on through the Value of Collections Task Team.

Sixteen institutions submitted reports through the online monitoring system. Institutions reported the following outputs for quarter 1 and 2 of the 2021/22 financial year:

Indicator	Q1	Q2	Year Total
Orphan collections: no. of specimens incorporated	7128	7660	14788
New specimens accessioned	37140	19949	57089
Number of DNA samples added	0	0	0
Number of tissue samples added	154	1955	2109
Number of DNA samples supplied for research purposes	211	363	574
Data provided to external users: no. of requests	68	56	124
Data provided to external users: no. of records	8669	33103	41772
Number of new specimen records added to Brahms/Specify	29891	7041	36932
Number of specimens imaged	24123	34621	58744
Number of specimens sent out on loan for research	5366	430	5796
Number of visitors using collection (national)	190	148	338
Number of visitors using collection (international)	9	5	14
Number of new species described	27	46	73
Number of papers published based on collection	57	50	107
Number of specimens identified: external stakeholders	6359	1460	7819
Number of outreach activities held	15	14	29
Number of learners/attendees exposed to the activity	11012	274	11286
Number of postgrad students using the collection	73	77	150
Number of students trained in the collections	17	67	84

*the total number of postgraduate students, local and international visitors may be inflated because the same student or visitor may have been counted each year because they used the collections more than once in separate years. Similarly the total number of students trained by staff in the collections may reflect the same student who was trained over more than one year.

These figures illustrate the extensive use of the collections and associated services, and the high number of outputs despite the impact of the Covid-19 pandemic and national lockdown.

4. Translational outputs: **the collections are used as a reference for the identification of materials in agriculture** (crop pests, livestock disease vectors and parasites, weed biocontrol agents, phytosanitary diagnostics for import and export of produce), **health** (eg. outbreak of head lice at a school), **environmental impact assessments** for development applications, postgraduate studies and for researchers in a number of different disciplines, and for the general public: 7,819 specimens have been identified for the first two quarters of 2021/22. The impacts of not having the correct identification include the loss of crops and livestock, or a global ban on export of produce, and delays in approvals for development applications or the loss of biodiversity through development.

Showcase publication and linked webinars launched showcasing the value of natural science collections and associated research to society. 3 showcases and webinars have been published covering the contribution of collections to food security and agriculture, the fight against pests and diseases and iconic and historically important specimens.

WHY OUR COLLECTIONS MATTER: A SHOWCASE SERIES



Showcase no.1 | Food Security and Agriculture



Showcase no.2 | The Fight against Pests and Diseases



Showcase no. 3 | Iconic, Extinct & Historically Important specimens

A collaboration Agreement was signed with the National Science & Technology Forum (NSTF) to include museum and herbaria interactive education and career information as part of the online interactive education tool (STEMulator www.stemulator.org).

5. **Development of an access policy and an access appeals process for implementation across institutions.** None of the institutions previously had either of these documents, and there have been challenges with ensuring transparent processes for providing access to external researchers.

6. **Agreements with partner institutions:** Funding for the upgrade of research infrastructure, collection care items and research equipment was allocated to 16 partner institutions by the NSCF Funding Panel (appointed through the Advisory Committee) in April 2020 based on the NSCF Funding Framework and Business Plan; and 15 Collaboration agreements have been signed for the 2nd phase of the project so far (Albany Museum, Amathole Museum, Agricultural Research Council, Ditsong Museum, Durban Natural Science Museum, East London Museum, Iziko Museum, KwaZulu-Natal Museum, McGregor Museum, National Museum, Port Elizabeth

Museum, South African Institute for Aquatic Biodiversity, Wits University's Moss Herbarium, UCT's Bolus Herbarium, UKZN's Bews Herbarium,). Funds were also allocated to SANBI's 3 herbaria, however an agreement will not be signed with SANBI seeing as it is the project's host institution.

Funds that were not spent from year 1 and 2 allocations were redistributed to institutions in June and July 2021 following the NSCF funding framework and approved by the funding panel.

Institutions procured collection care items in order to comply with the standards as set out in the Collection Management and Curation Manual in the form of temperature and humidity loggers, pest monitoring sticky traps, glass specimen jars, alcohol density meters, accession registers and ethanol indicator tablets. Collections spaces were also upgraded through the procurement of metal specimen cabinets and compactor units, chemical cabinets, freezers, roof insulation for collection rooms, collection room cooling units, dehumidifiers and extractor fans. Visitor stations were upgraded through the procurement of visitor dissecting kits, and a stereo microscope.

Challenges:

1. Administration and finances. Prolonged and complex processes involved in procurement of goods and services, which results in delays in spending of committed funds by institutions, including SANBI. This impacts not only expenditure but also delivery against targets. In addition, the project has been unable to procure any IT equipment since April this year due to problems with the SANBI service provider contract. There have also been huge delays from the SANBI SCM Unit in procuring bulk specimen jar lids (plastic lids that do not leak or deteriorate) for the network partners.

2. Cash flow challenges: We are required to retain sufficient funds in the cost centre to cover the full cost of all contracts, including collaboration agreements for institutions and staffing. This results in funds being tied up in two to three year contracts, but we are required by DSI to spend 90% of funds before the next allocation can be drawn.

3. Fostering a culture of serving society and accountability in institutions and staff, many of who have previously had a predominantly inward looking and self-serving approach to the collections and research.

4. Leadership challenges at institutions, with three of the four Directors at national museums changing over the last three years, and SANBI having had three CEOs and an Acting CEO for the last five years. Many of the managers of the collection institutions lack experience in collection curation and collections-based research which presents challenges in terms of supervision of staff to ensure implementation of the required standards and research leadership.

5. Status of the NSCF as a short term project within SANBI, which limits decision-making, with authority delegated to senior management who have limited involvement in the NSCF.

6. Construction of Co-ordinating Hub offices:

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. The initial plan was to include an exhibit area, but it is possible that this space will be required to house the Biodiversity Biobanks project Hub staff. 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 (EIA) was required before construction can commence. The anticipated completion was the end of 2018, however

commencement of construction was delayed by SANBI's process for appointing a consultant to conduct the EIA and queries on the EIA report to the Department of Environmental Affairs. The process has been further delayed as SANBI's infrastructure implementer contract expired and a new service provider had to be appointed to oversee the construction of the NSCF Hub offices. The anticipated completion of the construction of the new building is the end of 2022 or mid 2023. The SANBI National Herbarium building where the NSCF Hub staff were temporarily housed does not have sufficient space for staff to return to the office and maintain appropriate social distancing in compliance with the national lockdown regulations.

However, all of the NSCF staff have been operating at 100% time since the beginning of the lockdown. Outputs are monitored on a weekly basis with the submission of weekly reports by all staff, a weekly virtual team meeting is held and more frequent virtual interactions between staff working on specific projects. We have held a large number of meetings to deal with specific deliverables, and for the NSCF transformation / change management process. In terms of our deliverables, none have been impacted by staff working from home.

Contribution to Covid-19 pandemic

The natural science collections and associated research and staff have limited direct relevance to the pandemic. The institutions closed during the lockdown. Some staff returned to work on a rotational basis at level 3 of the lockdown, while others have worked from home since the beginning of the lockdown.

The NSCF Hub Team have worked effectively from home since the start of the lockdown, and have regular virtual staff meetings and submit weekly reports on outputs.

We recognised that staff at the partner institutions may need various forms of support through the lockdown, and in June 2020 we initiated a "check-in" project" contacting managers and individual staff to provide them with an opportunity to reflect on and discuss their concerns and thoughts about the situation. This assisted with feelings of isolation and fear.

Coordinating Committee meetings are now held monthly as a mechanism to check in with managers at institutions on individual well being and well being of their workforce, as well as their contribution to the NSCF targets while working under difficult circumstances during the pandemic.

The NSCF Team have also continued with posting on the NSCF Facebook page, producing a newsletter every second week, and running webinars for staff at all institutions.

We have been able to reduce our 2020/21 budget by 68% to allow reallocation of funds to government's Covid-19 funding.

1. Approval

Submitted by:



Prof Michelle Hamer

DSI-SARIR Projects Lead

Date: 19 October 2021

Approved by:



Prof Ramagwai Sebola

Chief Director, Biosystematics & Research Collections Division

Date: 20 October 2021