

REQUEST FOR TENDER

**Terms of Reference for:
Facilitation, Monitoring and Evaluation of a Transformation Process for the
Natural Science Collections Facility for a 25 month period**

Tender Number: SANBI: NSCF400/2021

Table of Contents

1. Introduction and background	3
2. Invitation for tender.....	4
3. Tender specifications/ Scope of work.....	4
4. Requirements for proposal	6
5. Non-compulsory virtual briefing session	7
6. General terms	7
7. Responsibilities of the Service Provider	7
8. Responsibilities of SANBI	8
9. Functionality evaluation criteria and PPPFA requirements	8
10. Confidentiality.....	9
11. Preparation of proposal	9
12. Tender documentation availability.....	9
13. Contract and contract period.....	9
14. Pricing specifications.....	9
15. Compliance reports and meetings	10
16. Safety, health and environmental requirements.....	10
17. Exclusivity.....	10
18. Fraud and Corruption.....	10
19. Submission of tender	10
20. Appendix	11
APPENDIX 1	12

1. Introduction and background

The Natural Science Collections Facility (NSCF) is one of the projects selected by the Department of Science & Innovation (DSI) for implementation from 2016/17 onwards as part of the South African Research Infrastructure Roadmap (SARIR). These research infrastructure projects are anticipated to be long-term initiatives, receiving funding from the DSI for 15-20 years depending on progress and successful achievement of deliverables.

The NSCF comprises a network of 16 institutions (universities, museums, science councils) that hold natural science collections, with a Co-ordinating Hub at SANBI. A common strategic and business plan, with shared aim, objectives and targets has been developed (see Appendix 1). Achievement of these requires the active participation and contribution of the NSCF partner institutions, and the operation of a network that is dynamic, responsive and sustainable. Most of the institutions were established more than 50 years ago, with several dating back more than 100 years and one that is almost 200 years old.

There are deeply embedded cultures and practices within most institutions, or components of institutions, and these can create resistance to the changes necessary to meet the requirements of working as a functional and integrated network. There are negative perceptions of what it means to operate a collections institution in an African context, to sharing specimen data, to providing access to collections and expertise, to being accountable to and serving society, and to acknowledging the history of our country and the injustices of the past, some of which still persist. This results in standards and procedures not being implemented, collections not being used to their full potential to meet the needs of society, a lack of staff diversity and inclusivity, especially for scientists / researchers, and in some institutions, low staff morale. However, the extent and severity of these challenges are not equally distributed across all institutions or even within a single institution. The state of the institutions in terms of their resourcing, infrastructure and productivity also varies. This adds to the complexity of working as a multi-institutional network. Addressing these issues is a major challenge that the NSCF must address to succeed.

An eight-month contract for a preliminary change management and transformation process for the NSCF was awarded in November 2017 and this was followed by a further 30-month contract from April 2019 to August 2021. This process highlighted the complexity of the organisational design of the NSCF and the change process required, and it has become evident that real transformation of practice and culture across 16 institutions requires a sustained effort. Some institutions may need more focused interventions to address specific problems. Implementation of standards and standard operating procedures across institutions requires that new ways of working are designed and piloted, and through a reflective process, redesigned or modified.

It is critical that appropriately experienced specialists work with the NSCF institutions, with a focus on the leadership, and with the NSCF Co-ordinating Hub staff over a sufficiently long period using a reflective and developmental approach to resolve the challenges and to bring about a new way of working and operating that is deeply embedded in the practices and culture of the institutions.

The creation of a robust network will require that transformation in relation to the aspects outlined above becomes an integral part of the way in which every aspect of the NSCF's and the institutions' work is seen. The services of a highly specialised independent facilitation team for a series of workshops for the managers / leadership of institutions participating in the NSCF, for the NSCF Co-ordinating Hub staff and for focussed intervention sessions within some institutions are required. The facilitators should have the capacity to work within complex organisational settings, and be able to tailor processes responsively, through an approach of reflective practice, and with the understanding of the paradigm of emergence in organisational development.

In order to track or monitor the process and to provide critical input for reflection, a specialised organization development evaluator is required to separately observe, assess and provide feedback on the impacts of the transformation processes that are being facilitated. The evaluator will also be expected to provide detailed documentation on observations which could be valuable not only for future activities of the NSCF but also for other institutions with similar challenges.

A 25-month contract is offered to facilitate, monitor and evaluate a transformation process for the NSCF.

2. Invitation for tender

Tenders are hereby invited for the Facilitation, Monitoring and Evaluating of a Transformation Process for the Natural Science Collections Facility for 25 month period. The tender process will be co-ordinated by SANBI Supply Chain Management (SCM) section at the following address:

Deputy Director: Supply Chain Management (SCM).

The South African National Biodiversity Institute (SANBI)

Private Bag X101, Silverton, 0184

Email address: sanbi.tenders@sanbi.org.za

The tender closes on: 1 October 2021 at 11h00

3. Tender specifications/ Scope of work

A 25-month contract is offered to Facilitate, Monitor and Evaluate the ongoing Transformation Process for the NSCF.

Note that for this tender, the following pre-qualification criterion for preferential procurement will be applied:

An Exempt Micro Enterprise ("EME") or Qualifying Small Enterprise ("QSE"). EMEs are firms with an annual total revenue of R10 million or less and QSEs are firms with an annual total revenue of between R10 million and R50 million;

SANBI requires the services of a highly specialised, consistent and independent (two to four person) facilitation team as well as a specialized organizational development evaluator to facilitate, monitor and evaluate a reflective and responsive transformation and change management process for the leadership/managers of the institutions participating in the NSCF, for the Co-ordinating Hub staff, and to implement interventions within several relevant institutions. The same facilitation and evaluation team members assigned to this project must fulfil all the tasks of the project.

The Service Provider team is required to meet the following requirements in terms of skills and experience:

- All team members to hold a tertiary level qualification;
- All team members to have completed at least one training course or workshop in the following: facilitation, transformation, organizational design, organizational development, evaluation and monitoring processes;
- All team members to have led at least one project working in a transformation context with an academic or research institution (either as facilitator or evaluator);
- At least one team member to have developed a tailor-made transformation process to address the needs of an individual institution / organization / company;
- At least one team member to have facilitated or led at least two projects dealing with organisational design / development;
- All team members to with experience in writing reports relating to transformation processes.
- Facilitators and the evaluator must be willing to travel for workshops and meetings nationally as required and must have a valid driver's license.
- Facilitators and evaluator must have reliable and appropriate internet connectivity to enable virtual meetings.

The following deliverables will be required for this contract:

For the Facilitators:

- Contracting or briefing sessions to be held with a reference group to discuss the environment and the expectations of the process and to finalise the details of the contract (2 days).
- A series of intensive workshops for 30 managers/leaders of the NSCF, including the Co-ordinating Hub staff. Five workshops, spanning a total of 15 hours each (three mornings of 5 hours) are proposed, with a total of 10 days but it will be acceptable to reconfigure this arrangement, with the total number of days remaining constant.
- Two half-day sessions with the Advisory Committee of the NSCF (this includes representatives of the highest level of governance for the partner institutions).

- Briefing sessions to be held with the Co-ordinating Hub staff, potentially to align with the timing of the workshops (10 days).
- Input into the programme for the NSCF Forum, overall facilitation of the event and leading of selected sessions. This event is open for all staff participating in the NSCF, and is likely to be virtual, with an estimated 100 participants, and is proposed to run for four mornings in a week (20 hours) (3 days).
- Interventions at selected institutions (total of 15 days).
- Four brief (3-5 page) reports on processes followed, responses and progress to be submitted at agreed on intervals.
- A final report (8-10 pages).

For the evaluator:

- Contracting or briefing sessions to assess the status of the NSCF at the start of the process (2 days).
- Observation of components of the workshops (2 days x 5) / institution intervention sessions (6 days), to feed into the workshop and final reports.
- Feedback and reflective sessions as part of the briefing sessions with the facilitators and Co-ordinating Hub staff and separately with the facilitators (8 days).
- Three reports at agreed on intervals that critically reflect on the process followed, impacts and responses and makes recommendations for future workshops / activities (5-10 pages).
- Final, detailed report that documents processes and critically assess processes and impacts and makes recommendations (20-30 pages).

The following broad deliverables and time required are anticipated and should be used as a basis for costing:

Table 1: Proposed deliverables and time allocation to be used for costing purposes

	Deliverables	Days per person	Daily Rate per person	Total per person
Facilitators				
1.	Contracting / briefing sessions	2		
2.	5 x 3 morning workshops for managers	10		
3.	Workshop preparation time x 5	10		
4.	Briefing sessions with Co-ordinating Hub staff x 5	10		
5.	Briefing sessions with Advisory Committee x 2	1		
6.	Briefing sessions preparation time x 6	6		
7.	Interventions at selected institutions	15		
8.	Interventions preparation time x 15	15		
7.	Interim reports (4) and final report	10		
8.	NSCF Forum preparation and facilitation	5		
8.	Implementation support and contingency	11		
	Total days required per person	95 days		
Total cost for all Facilitators				
Evaluator				
1.	Contracting / briefing sessions	2		
2.	Observations and documentation of workshops for managers (2 days each x 5)	10		

3.	Briefing sessions with facilitators and with Co-ordinating Hub staff	8		
4.	Institutional sessions (selected): observations and documentation	6		
4.	Reflective reports on selected sessions (3) and final report (1)	12		
5	Implementation support and contingency	4		
	Total days required	42 days		
Total cost for Evaluator				
Grand Total Cost				

It is anticipated that the scope of work represents 95 days of work per person, for two facilitators (total of 190 days), and 42 days of work for the evaluator over a 24-month period.

4. Requirements for proposal

Mandatory documents required:

Tenders must include the following documentation (Failure to submit this required documentation WILL lead to disqualification):

- A letter of Good Standing from the office of the Compensation Commissioner as required by the Compensation for Occupational Injuries and Diseases Act (COIDA), if applicable. The letter should be issued by the Department of Labour.
- A copy of the Central Suppliers Database (CSD) registration report.
- Fully completed SBD forms.
- Fee/cost structure as specified in Table 1 and section 14 below. This should **be submitted with "original" tender document only as per section 19 below. Inclusion of pricing in any 'copy' will result in the tender being rejected.**
- UIF compliance demonstrated by submission of one of the following, if applicable:
 - A valid copy of the UIF Letter of Compliance issued by the Department of Labour, or
 - Labour uFiling Employer Statement of Account indicating UIF payments or accruals not older than 12 months, or
 - SARS eFiling Employer Statement of Account indicating UIF payments or accruals not older than 12 months, or
 - Valid proof of exemption for UIF.
- In the case of Service Providers who have employees (i.e. a company rather than an individual consultant), a UIF Compliance Certificate and COIDA Letter of Good Standing must be submitted as requested above.
- Sworn Affidavit for EMEs and QSEs verification.

Other documents for evaluation:

Each tender document should also include the following documentation, although failure to submit these documents will not result in disqualification. However, the information contained in them is required for evaluation purposes:

- A concise written proposal, no longer than three pages, that summarizes the approach that will be used for this project, and the proposed schedule of work to complete the project.
- CVs of the staff to be involved in the project, detailing qualifications, training and relevant experience.

- A summary of similar projects carried out over the last five years, with a focus on the approach used and the outcome and specifying the role of the staff included in the bidding team in these projects.
- A budget for the proposed work detailing daily rate for facilitators and evaluator, and total cost according to the number of days specified in Table 1. The budget should only cover the prospective Service Provider's time (inclusive of VAT). All travel costs for the consultation and training will be covered separately by the NSCF, and will be according to SANBI's travel policy (see section 14).
- Details on the Service Provider's contribution towards equity.
- Details of any contribution to empowerment of historically disadvantaged individuals (HDI) and/or transformation of the sector.

5. Non-compulsory virtual briefing session

SANBI is committed to the health and safety of all bidders and staff members and reducing the spread of COVID-19. As a result, with guidance from regulations published by the National Department of Health, no compulsory on-site briefing session will be held for this tender.

Prospective tenderers are however encouraged to participate in a virtual non-compulsory briefing session to be held as follows:

Date: 15 September 2021

Time: 14:00

Meeting link:

<https://us06web.zoom.us/j/85138982781?pwd=SGRSQitpUFJSRWhyUFI2TzdFZytDUT09>

Meeting ID: 851 3898 2781

Passcode: 774234

Bidders are encouraged to direct all technical and bidding procedure enquiries to the email addresses below. All responses to questions via email and at the non-compulsory briefing session will be communicated via this tender's advertisement webpage on the SANBI website at: www.sanbi.org

- For bidding procedure enquiries: sanbi.tenders@sanbi.org.za
- For technical enquiries: m.hamer@sanbi.org.za

Cut-off date for enquiries: 21 September 2021

6. General terms

- All documents submitted in response to this Terms of Reference (ToR) must be written in English. All tenders will be valid for a period of four months (120 days) calculated from the closing date of this tender.
-
- The appointment as a successful Service Provider shall be subject to all parties agreeing to mutually acceptable contractual terms and conditions. In the event of all parties failing to reach an agreement within 30 days from the appointment date, SANBI reserves the right and shall be entitled to appoint the second highest bidder, or to re-advertise should that Service Provider not be acceptable.

7. Responsibilities of the Service Provider

The Service Provider will be responsible for:

- Developing the materials required for all contracting and briefing sessions and for the workshops.

- Working with the NSCF Co-ordinating Hub staff to ensure that the equipment and other requirements for the sessions and workshops are available.
- Facilitating the workshops according to the agreed on objectives.
- Submitting reports as required (see point 15 below).
- Issuing invoices to SANBI according to the milestones that will be detailed in the contract.

8. Responsibilities of SANBI

SANBI will be responsible for:

- Organisation of logistics for workshops and briefing sessions, including venues and travel and / or set up of virtual platforms as required.
- Distribution of materials for workshops and sessions to relevant participants.
- Payment of invoices from the Service Provider within 30 days of receipt.

9. Functionality evaluation criteria and PPPFA requirements

In accordance with the National Treasury Instruction Note on the Amended Guidelines in Respect of Bids that include Functionality as a Criterion for Evaluation (issued 3 September 2010), this tender will be evaluated in two stages:

The first stage will evaluate functionality according to the criteria listed in the table below:

Table 2: CRITERIA FOR EVALUATING FUNCTIONALITY	WEIGHT
Past Experience: This refers to the experience of the Tenderer to undertake the scope of work involved in this Tender. (a) Description of projects similar in scope to this tender carried out in the last five years, with a focus on any work done in the academic / research environment. The role of the staff involved in the Tender must be specified.	20
Team Capacity: The Tenderer should demonstrate the capacity of the team to carry out the work required in this Tender. (b) CVs for the two facilitators. The following will be assessed: (i) qualifications and training of the two facilitators (relevance of qualifications and training (including workshops and conferences attended; extent of training / number of different courses completed / workshops / conferences attended)) (ii) skills of the facilitators relevant to the requirements (c) CV for the organisational development evaluator. The following will be assessed: (i) qualifications and training (relevance of qualifications and training; number of courses completed or workshops) (ii) skills of the evaluator relevant to the requirements	30 (20) (10)

Proposed approach and technical merit of the proposal:	50
(d) Proposal presentation (spelling, grammar, layout, completeness)	(10)
(e) Extent to which the proposal addresses the specific brief for the services required (multi-institutional network, research / collections institution environment, challenges listed addressed, role of evaluator specified)	(20)
(f) Extent to which an understanding of the concepts of complexity and emergence in organisational design and development, reflective loops, responsive design, social justice issues prevalent in South Africa is shown in the proposal	(20)
TOTAL	100

Bids that fail to score a minimum of 70 points out of 100 points for functionality will not be eligible for further consideration.

The second stage will evaluate the price and Broad-Based Black Economic Empowerment (B-BBEE) preference points of those bids which meet the minimum threshold for functionality. In accordance with the Preferential Procurement Regulations, 2011 pertaining to the Preferential Procurement Policy Framework Act (No. 5 of 2000), the 80/20 point system will be applied in evaluating proposals that qualify for further consideration, where price constitutes 80 points and 20 points will be awarded based on the bidder's B-BBEE Status Level Certificate.

Sufficient information must be provided to allow the Bid Evaluation Committee to score bids against all these criteria.

10. Confidentiality

Any or all information made available to the Service Provider by SANBI shall be regarded as confidential and shall not be made available to third parties without the prior written consent of SANBI.

11. Preparation of proposal

SANBI shall not be held liable for any cost that has been incurred by the Service Provider in the preparation of the proposal, the obtaining of certificates or any other cost that might be incurred in submitting the proposal.

12. Tender documentation availability

Bidders are requested to download the tender documents from the SANBI website www.sanbi.org.

13. Contract and contract period

The Service Provider will be required to sign a contract with SANBI and this will be performance based.

The contract period is 25 months, with the implementation dates anticipated to be from 1 January 2022 to 31 January 2024.

14. Pricing specifications

The following costing information must be provided **only in the envelope with the original documents**:

- A budget for the proposed work detailing daily rate for facilitators and evaluator, and total cost according to the number of days specified in Table 1.

Notes for the budget:

- The budget should only cover the prospective Service Provider's time.
- Travel arrangements will be made through the NSCF and should **NOT** be included in the

budget.

- Printing of workshop materials and reports will be paid for separately and **must NOT** be included in the costing.
- Cell phone expenses and e-mail / internet access are for the Service Provider's own account.
- All costs should be VAT inclusive.

15. Compliance reports and meetings

- The Service Provider will be expected to provide four interim reports in writing at agreed intervals as well as a final report from the facilitators, and three interim reports at agreed intervals and a final report from the evaluator.
- The Service Provider team will be expected to participate in briefing or contracting sessions with the Co-ordinating Hub staff, including the NSCF Lead and Project Manager. At least two of these sessions will be held.

16. Safety, health and environmental requirements

All Service Providers entering into a contract with the South African National Biodiversity Institute (SANBI) shall, as a minimum, comply with the following requirements, if applicable:

- The Compensation for Occupational Injuries & Diseases Act (Act 130 of 1996): The Service Providers will be required to submit a letter of good standing from the office of the Compensation Commissioner as required by the Compensation for Occupational Injuries and Diseases. The letter should be issued by the Department of Labour.
- A current, up-to-date copy of the Compensation for Occupational Injury and Diseases Act (COIDA) shall be available on site at all times.

National Environmental Management Act (Act No. 107 of 1998). The South African National Biodiversity Institute Health and Safety specification and relevant policies, including SANBI Covid-19 protocols.

17. Exclusivity

The successful Service Provider is not guaranteed of any business from SANBI that may be arising from time to time pertaining to similar or other services. The Service Provider will be entitled to compete on an equitable basis for any such business on a quotation or tender basis.

18. Fraud and Corruption

- Any effort by a Bidder to influence the bid evaluation, bid comparisons or bid award decisions in any matter, may result in rejection of the bid concerned.
- The SANBI shall reject a submission if the Bidder has committed a proven corrupt or fraudulent act, or any other improper conduct in bidding for any other work.
- The SANBI may disregard any submission if that Bidder, or any of its directors -
- have abused the Supply Chain Management (SCM) system of any Government Department/ institution;
- have committed proven fraud, corruption or any other improper conduct in relation to such system;
- have failed to perform on any previous contract and the proof thereof exists; and/or is restricted from doing business with the public sector if such a bidder obtained preferences fraudulently or if such bidder failed to perform on a contract based on the specific goals.

19. Submission of tender

Service Providers are to submit (1) printed document **with pricing** included in an envelope, marked 'ORIGINAL', and in a separate envelope provide a copy of the document **without pricing** as a PDF file on a memory stick.

NB: Failure to submit one printed document with pricing in one envelope, and a document without pricing on a memory stick will lead to your bid being disqualified.

Tenders can be submitted in the tender box located in the Biodiversity Building at the Pretoria National Botanical Garden, 2 Cussonia Avenue, Brummeria, Pretoria, during office hours (08:00 – 16:00). Tenders may also be submitted by post, addressed to:

Deputy Director: Supply Chain Management.

The South African National Biodiversity Institute (SANBI)

Private Bag X101, Silverton, 0184

Email address: sanbi.tenders@sanbi.org.za

Tender Number: **SANBI:NSCF400/2021**

NB. All documents must be clearly labelled.

Closing date for submissions is: 11:00 on 1 October 2021.

Note: E-mailed and faxed submissions will not be accepted. Late submissions will be disqualified.

20. Appendix

Appendix 1: An overview of the Natural Science Collections Facility, with three-year business plan.

APPENDIX 1



Business Plan: 2019/20 – 2021/22: V06

1. Background

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 100 natural science collections at approximately 40 institutions that together provide over 18 million objects or specimens representing about 100,000 different species of plants, animals, and fungi, assembled over the last 200 years and representing life on earth since its origins.

These collections are critical infrastructure for the field of taxonomy, which documents, organizes, describes and names species and documents their geographic distribution, and enables accurate identifications of biological materials which is fundamental for all areas of research and practice that involve living organisms. This includes agriculture and fisheries, human health, protection of ecological infrastructure, enforcement in the illegal wildlife trade, climate change adaptation, and indigenous knowledge systems.

The data associated with the specimens in natural science collections is also part of the infrastructure and includes not only the species' identity, but also the date of collection and the locality where the specimen was collected. Data sets integrated across institutions and analysed can provide an understanding of past and present patterns in the distribution of biodiversity, and allow future predictions that can inform decision-making.

The actual specimens, because they have been collected over time, can be studied to understand emergence / origins and spread of pests, pathogens, disease vectors and alien invasives, and past diets and movement which informs management and preventative strategies for health and agriculture.

The specimens held in the collections include a wide range and number of fossils, which are essential for research in the palaeosciences, for which South Africa is globally recognized, and which can provide a unique understanding of past climate impacts on biodiversity.

Considering the current global climate and extinction crisis, and with increasing recognition of how dependent humans are on functioning ecosystems and natural resources for their survival, the natural science collections, associated data and services are important for understanding impact, mitigation and adaptation, and protecting the systems that sustain life. The impacts or outcomes from research and data from collections are, however, generally indirect or downstream (Figure 1) which means that their significance is often not well understood or recognized which leads to a lack of appreciation of this infrastructure.

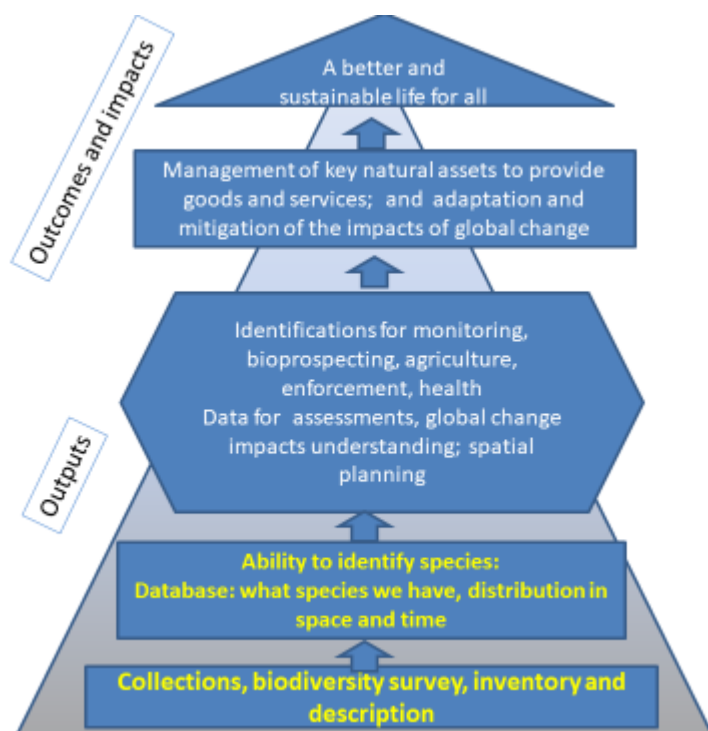


Figure 1. Value chain for natural science collections and associated data and expertise.

Collection-based research is also used to inform museum displays and education and awareness programmes for both school learners and the general public. These can contribute to promoting sustainability, and displays and programmes that recognize the African context and indigenous knowledge systems can promote social cohesion.

This means that the natural science collections and associated research are of relevance to several of the Sustainable Development Goals, including (2) Zero Hunger, (3) Good Health and Well Being, (4) Quality Education, (6) Clean Water and Sanitation, (11) Sustainable Cities and Communities, (13) Climate Action, (14) Life Below Water, (15) Life on Land, (16) Peace, Justice and Strong Institutions.

2. The Natural Science Collections Facility: 2016/17 – 2018/19

The Natural Science Collections Facility (NSCF) is one of the Department of Science & Innovation's South African Research Infrastructure Roadmap (SARIR) projects that was initiated in 2016 and formally launched in October 2017. The NSCF is a network of institutions that hold major natural science collections, with a co-ordinating Hub hosted by the South African National Biodiversity Institute (SANBI). There are currently 14 institutions

participating in the NSCF, including national and provincial museums, one municipal museum, three science councils and three universities.

The operating structures of the NSCF include a Co-ordinating Committee which comprises the management of participating institutions, which is responsible for planning and ensuring implementation within institutions, and Working Groups that each focus on a major work package and that include representatives from the institutions. High level governance is through SANBI's Executive and Board, and there is an Advisory Committee that includes representatives from relevant government departments and senior managers from participating universities and science councils. The Co-ordinating Hub team includes staff who lead and co-ordinate the implementation of the business plan, manage the budget, contracts and collaboration agreements with institutions, report to both SANBI and the DSI, facilitate the networking and communication activities and meetings of Co-ordinating Committee, Advisory Committee and Working Groups, organise the NSCF Forum and draft guidelines and standards. Staff who are responsible for upgrading of specimen data are also part of the Hub team.

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, with the second scheduled for May 2019. 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.

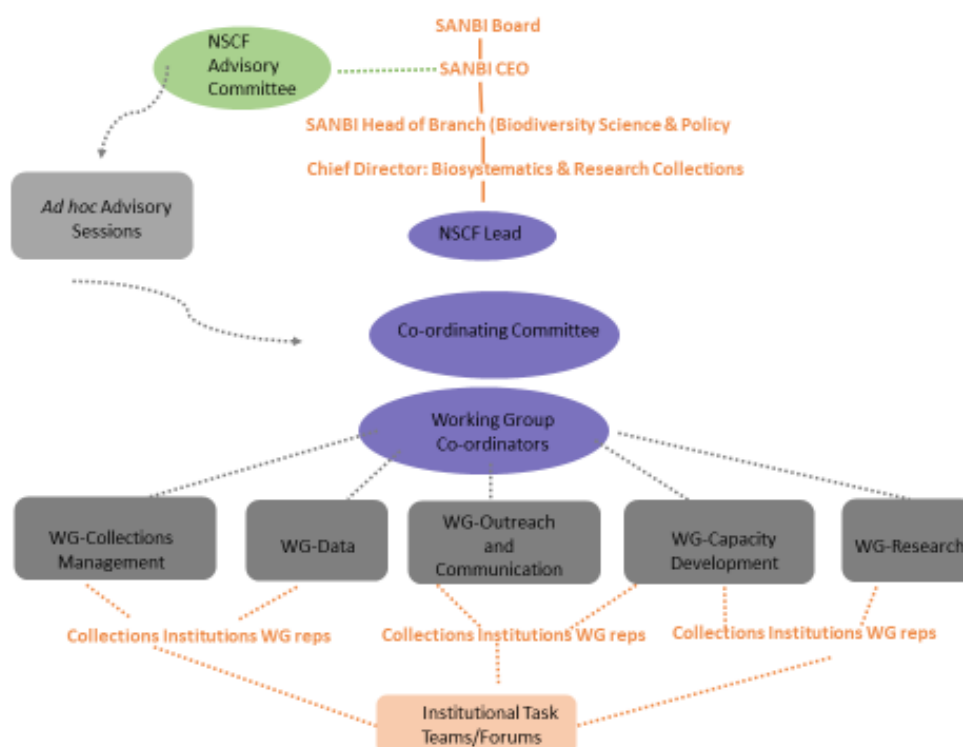


Figure 2: Governance and operational structures of the NSCF.

3. Purpose and goals of the Natural Science Collections Facility

Purpose of the NSCF:

To work as a dynamic network that values and recognises the African context, **to promote, upgrade and make accessible natural science collections and data for research and services to enable sustainable, enriched life on Earth.**

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.

4. Milestones / deliverables for the NSCF: 2019/20 – 2021/22

2019/20	2020/21	2021/22
1. Securing collections – ensuring collections meet global standards		
○ 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.	○ 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.	○ 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.
2. Upgrading and expanding collection specimen databases, and making these openly accessible in an integrated way for research, biodiversity assessment and decision-making		
○ 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.	○ 100 000 specimen records captured or upgraded (selected invertebrates – for Threatened Species Assessment (see point 5 below), 3 new plant families). ○ Data submitted to and made accessible through GBIF.	○ 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.

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.		
Imaging of type specimens for Virtual Museum: 1000 specimens imaged (vertebrates, 3 plant families, Karoo fossils).	1000 type specimens imaged (selected invertebrates, Karoo fossils) for the virtual museum. - Online virtual museum architecture set up and content uploaded.	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.
4. Global use of collections for research and capacity development		
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	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	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
5. Translational research / services outputs (societal impacts)		
Over 10 000 biological specimens identified per year, including, but not limited to the following sectors: Agriculture: - 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. 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. 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	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.	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.

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. Adoption of new technologies for identification of biological material: ○ 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. ○ Development of plan for DNA barcoding of collection specimens to develop the DNA barcode reference library.		
Spatial planning and decision-making for development: ○ Plan developed with SANBI's Threatened Species Programme, for assessing threat status of ecologically / economically important biodiversity. 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.	○ Surveys, taxonomic research and data capture for animal groups targeted for assessment: (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.	○ Promotion of specimen datasets amongst national and provincial conservation authorities, municipalities and consultants for use in impact assessments and decision-making in development applications. ○ Data and expert input for threatened species assessments. 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.
○ 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.	○ 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	○ 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

	building and public understanding initiatives at museums.	illustrate how scientists use the collections to solve societal and economic problems, and to highlight iconic specimens. This addresses objectives in the DSI White Paper.
6. Human resources management and capacity development		
- 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).	- 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).	- 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).
7. Organisational development & support – strengthening the internal structures of the NSCF to enable the long-term sustainability of the collections and associated research to benefit society		
- Leadership development: 25-35 participants in 2 workshops for development and transformation to ensure long term sustainability of collections and NSCF. - 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	- 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.	- 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.

use of collections and data for research (minimum of 3 / year).		
8. Governance		
○ 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.	○ 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.	○ Meetings of Advisory Committee (twice a year); Co-ordinating Committee (3 times a year), and four Working Groups (1-3 meetings annually each) ○ Six monthly and annual reports to DSI; quarterly report to SANBI EXCO/ Board.

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.

Deliverables	Outputs	Outcomes	Impact
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. Monitoring and assessment system developed for natural science collection management and conservation to determine status and risks. Report on the status of natural science collections, including risks and required resources and interventions, based on assessment using the system developed, and	Well managed, accessible and secured collections of biological specimens	Increased research and education outputs in a range of fields, by national and international scientists	Increased knowledge of South Africa's past and present biodiversity for the benefit of all of society; International recognition for SA collections

using the 2009/10 assessment as the baseline. Rescue of three orphan and at risk collections and movement into secure environments, based on the assessment report.			
Development of a curriculum for training in collection management and conservation procedures and standards, and implementation of short courses for staff and postgraduate students Training in collection data management at three levels, with courses at first two levels implemented 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. NSCF Forum to bring all staff together to strengthen the network and share knowledge and experience. 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.	Collection based staff and postgraduate students upskilled	Upskilled and qualified collections-based staff; greater effectiveness and efficiency in curation and management of collections	Skilled and qualified staff; motivated staff; secured collections used globally by scientists to address critical issues related to biodiversity
Increasing access to collections by experts through provision of travel grants, which also adds value to collections (10 grants awarded) Reduced number of grants awarded, and	Integrated and openly accessible specimen data sets, including images of specimens used by researchers, postgraduate students, undergraduates and	Increased research and education outputs in a range of fields Inclusion of wide range of species in impact assessments and decision-making in development applications	Sustainable development , protection and use of biodiversity; Involvement of broader society in decision-making

only if travel restrictions are lifted in 2021. 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 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. Monitoring the use of the collections nationally and globally (number of visitors, loans, data use) with input into Annual Reports The use of the collections will be reduced because of reduced number of visitors and loans of specimens sent out.	learners globally, and nationally by EIA practitioners, threatened species experts, and conservation authorities. 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	Information provided for National Biodiversity Assessment	
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	DNA barcode reference library expanded for use by a range of stakeholders	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. 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. Trade in indigenous species: investigations and prosecutions need accurate identifications for illegally harvested and traded plants and animals. Illegal trade	Increased food security and economic benefits from trade in agricultural products; reduced loss of biodiversity and revenue from legal trade in biodiversity

		poses a risk to South Africa's unique biodiversity, and results in loss in revenue for legal breeders and traders (eg. indigenous plant breeders,	
Production of a report on use and impacts of collections, data and research Assessment of iconic specimens in collections to highlight heritage value of natural science collections 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	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 economic problems, and to highlight iconic specimens	Improved public understanding of biodiversity, its importance for human well-being and for national and cultural identity Society participates in and contributes to collection and biodiversity related activities Cross cultural appreciation for varied values for species Policy decisions that recognise the value of collections so that they are protected for future generations Improved understanding of biodiversity and related research and discovery by school learners; inspired learners	Biodiversity and collections viewed as national assets and treasures; social cohesion; increased interest in life sciences by learners
Transformation process to strengthen leadership and the network and to recontextualise the collections and associated science: report on transformation journey produced to assist other programmes 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.	Increased leadership capacity and capability in collection institutions Increased buy-in and support for NSCF amongst staff at collection institutions Increased appreciation for diversity, inclusivity and the African context of the collections and associated science Increased collaboration and sharing of resources across institutions	Secured collections, with increased efficiencies and productivity Novel science and interpretation / displays based on indigenous knowledge systems Other initiatives involving the development of networks of institutions able to learn from the experience of the NSCF	Sustainable institutions and network; accessibility of information from collections to a wide range of South Africa's population

