Natural Science Collections Facility

SOUTH AFRICA

Half-year Report to the

Department of Science, Technology & Innovation

1 April to 30 September 2025

science, technology & innovation

Department:
Science, Technology and Innovation
REPUBLIC OF SOUTH AFRICA

SANBI
Biodiversity for Life
South African National Biodiversity Institute

Contents

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, bio prospectors, 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. There are currently 18 institutions participating in the NSCF, including three national and five provincial museums, one municipal museum, four science councils, four universities and one citizen science organisation. SANBI is responsible for the overall implementation of the project plan and management of the budget allocation for the NSCF from the DSTI. 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.

Expected deliverables, outputs, outcomes and impacts

Deliverables specified in the Agreement between the Department of Science, Technology & Innovation and SANBI for the NSCF from 2024/25 to 2028/29.

Deliverables	Outputs	Outcomes	Impact
Publication of methods and approaches used in 2023 collections assessment	Papers published in peer reviewed journal	Sharing of knowledge and tools developed by NSCF internationally	Recognition of NSCF and South Africa for innovation in collection assessment
Three to six orphan and at risk collections transferred to secure environments according to the NSCF guidelines	Well managed, secured and accessible collections of biological specimens; secured for long term use.	Increased research and education outputs in a range of fields, by national and international scientists currently and into the future.	Increased knowledge of South Africa's past and present biodiversity for the benefit of all of society, including future generations; International recognition for SA collections
Online tracking tool for status of collection management and curation - ongoing updates by collection institutions according to progress on meeting standards set in NSCF Manual	Information available for collection management and curation activities and targets in annual and three-year plans of institutions and individual workplans. NSCF Hub staff able to identify problem areas for interventions (training, investment or other forms of support).	Efficient allocation of resources to address priorities. Increased accountability.	
Virtual museum includes type specimen images (>3000 specimens); herbarium specimen images (>1.5 million); specimen data sets (15 collections); and archival documents (1000) for plant, animal, fungi and fossil groups	Integrated and openly accessible images of specimens and digitised archival documents used by researchers, postgraduate students, undergraduates and learners nationally and globally.	Increased research and education outputs in a range of fields. Reduced impact of use on specimens and documents which results in longer term preservation.	

Review of status of collection data sets (extent, quality and completeness; extent of publication on GBIF) **Tracking tool for status of specimen data**: extent of digitization, verification, upgrading and publication on GBIF	Information available for data management and digitisation activities and targets in annual, three-year and individual workplans. Informed decisions for NSCF plans.	Increase in extent and quality of data available for research and decision-making. More efficient use of resources by institutions and NSCF to address priorities.	Improved quality of biodiversity assessments and decision-making to mitigate development impact on biodiversity; sustainable development. Increased knowledge generation in a wide range of fields including biodiversity conservation, climate change and mitigation; and improved conservation assessments
Expansion of collection data sets: data for a minimum of 300 000 specimens captured **Publication of at least 15 new collection data sets on GBIF**	Specimen data accessible globally for research, decision-making.	Increased use of collection data for research and decision-making.	
At least 3 Communities of Practice established for collection management and curation; data management, with regular sessions focused on specific topics identified in the collections assessment **Attendance by staff at a minimum of 6 courses in collection management / curation and data management** **Participation in a minimum of 6 international conferences and workshops** on natural science collections and data **Three NSCF Forums** to bring all collection staff together to share knowledge and experience	Collection based staff, including interns and postgraduate students upskilled. NSCF network strengthened.	Upskilled and qualified collections-based staff; greater effectiveness and efficiency in curation and management of collections. Sustainable network developed with increased collaboration and sharing of knowledge and resources.	Improved capability of institutions. Secured collections used globally by scientists to address critical issues related to biodiversity.

Organisational development and transformation sessions run with a minimum of 6 institutions; and with the NSCF Hub team	Institutional plans for collection management and curation, data management and research. Improved team coherence and effectiveness within institutions and the NSCF Hub.	Improved standard of collection management and curation; data management. Improved efficiency and productivity; use of scarce resources.	Collection management and curation, data management, research improved in institutions in both short and long-term
Emerging leaders development: at least 6 sessions run	At least 30 young staff working in collections as researchers, curators or technicians developed to play leadership role.	Improved succession in institutions. Improved productivity of staff in institutions. Youth empowerment.	
Report and publication on the impact of collection-related research and data in terms of the value chain	At least 1 paper published. Identification of mechanisms to improve knowledge and data flows.	Improved understanding of the value of collections and associated data. Increased accessibility of knowledge and data from collection-based research.	Improved evidence-based conservation and sustainable use of biodiversity
NSCF website provides materials promoting the value of natural science collections	Video showing collections, iconic specimens. Downloadable showcase documents explaining value of natural science collections.	Improved public understanding of biodiversity, its importance for human well-being and for national and cultural identity.	Biodiversity and collections viewed as national assets and treasures of value for science and decision-making; social cohesion; increased interest in life sciences by learners

2. Aim and objectives

The overall aim of the NSCF is to enable sustainable, enriched life on Earth by working as a dynamic network that values the African context, **to promote, upgrade and make accessible natural science collections and data for research and services.**

In order to realise this aim, the NSCF has the following overall goals:

NSCF goals, progress and future plans

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 palaeosciences, for contributing to documenting past and present biodiversity, understanding global change impacts on species and biological communities, and possible mitigation and adaptation mechanisms.

2024/25 – 2028/29

- The methodology and approach for the collection assessment are novel and could be used internationally by other research collections or network initiatives (there is currently no standard system for assessing management and curation status). This will be published in appropriate international journal/s.
- The assessments have revealed some collections that remain at significant risk of deterioration and loss. There are a number of factors that are responsible for this situation and in some cases the collections or at least the most significant specimens should be moved to more secure institutions. This will require negotiation and support for packing and moving the collections and their accessioning at the receiving institution. Guidelines for decision-making for moving orphaned collections are required, including resourcing of recipient institutions and legal considerations.
- Support will be provided to institutions for addressing gaps in documentation (policies, procedures, workflows and standards) and for some of the curation processes. This support will be in the form of a number of Communities of Practice, co-ordinated and facilitated by the NSCF Hub together with staff from partner institutions.
- Interventions in the form of guidance and support for aligning plans with the gaps identified are planned, with the assistance of organisational development and transformation facilitators.

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 (only an estimated 50% of specimens have label data captured in databases), with a large number of specimens for which data have not been captured (estimated 6 million, mostly insects) and gaps in the data for which there are digital records.

2024/25-2028/29

- We have realised that the process of transcribing/ digitising specimen data using an NSCF appointed team of data technicians was inefficient in relation to the extent of the work and the salary costs. Over the next year the **use of automated technologies and machine learning will be investigated** in collaboration with international teams and if feasible, implemented to increase specimen data sets over the subsequent five years.

- A **detailed analysis of the status of existing specimen data sets, the publication of these and use of published data** will be carried out to inform data mobilisation and publishing activities, as well as the development of a progress tracking tool.
- More **targeted and strategic data mobilisation and publishing activities** will be carried out depending on user needs (e.g. species threat assessments and data for the Department of Fisheries, Forestry and Environment's screening tool, projects on food and medicinal plants).

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.

2024/25 – 2028/29:

- The Living Atlas software which is open source will be used to set up the platform.
- Specimen data sets, specimen images and digitised documents will be uploaded and made accessible on an ongoing basis.
- Herbarium specimen imaging will continue and completion of all of the medium sized and smaller herbaria is expected by the end of 2026.
- SANBI is working with a conveyor belt system for imaging of the two largest herbaria (National and Compton Herbaria) and they are also expected to complete the work by the end of 2026. This system will then be moved to herbaria in other African countries.
- All newly collected specimens will be imaged on a regular or ongoing basis depending on the availability of equipment.
- Imaging of Karoo fossil and vertebrate (mammal, bird, reptile, amphibian and fish) type specimens will continue and it is expected that this will be completed by the end of 2026.
- Technologies for mass digitisation of millions of insect specimens need to be explored and potentially implemented from 2026/27.
- Digitisation of historical accession registers / catalogue books, field notes and research notes related to collections will continue and priority documents will be completed by the end of 2028.

4. Research outputs and translational research: understanding the use, impact and value of natural science collections

2024/25 – 2028/29

- Over the next three years we intend **investigating how the taxonomic outputs are used by other researchers and for informing policy and decision-making and how knowledge flows along the value chain**. This is essential to promote an understanding of the value of the collections as well as for addressing any breaks or blockages in the chain. Partnerships with institutions or units that have experience in bibliometrics and scientometric analyses will be necessary for this research. We will also analyse the use of collection data sets for South African biodiversity accessed on GBIF.
- The report and publications from the analyses will include **recommendations for increasing access, uptake and use of publications and data for enhancing impacts and benefits to society** and these will be implemented in from 2027.
- The NSCF Hub will continue to co-ordinate **the use and outputs from the collections and data** and will need to develop mechanisms to track use of the Virtual Museum resources.
- **Data and specimen identification services will be provided to requesters** on an ongoing basis. This includes provision of data for conservation and threat assessments for species, for the DFFE Screening Tool for land use decision-making, and for environmental impact assessments. Identification of biological material is carried out for a wide range of clients. These services are generally demand driven rather than being initiated by the collections community.

5. Outreach and communicating the value of natural science collections

The natural science collections are generally inaccessible to the general public, and few people, including decision-makers are aware of their existence or extent or value. The collections are often perceived as colonial relicts or as curiosities rather than as critical research infrastructure and a tangible, irreplaceable reference for the country's biodiversity.

2024/25-2028/29

- Over the next six years communication and outreach activities will be more targeted and strategic to **promote understanding of the value of collections to society**. The information presented will 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 lack of awareness of the value of the collections posing a threat to the sustainability of natural science collections.

- Some of the specific activities and outputs include the development of videos of collections and specimens of scientific or cultural significance for distribution on the Virtual Museum and other appropriate platforms, compilation of recommendations for museum displays on the collections and biodiversity to increase relevance to the African context and increasing public engagement in this topic.

6. African and international engagement

The value of international engagement through attending and presenting at conferences and workshops and participation in international bodies has become evident over the last few years, even though this has been predominantly virtual / online. We will increase international engagement through participation in the Society for the Preservation of Natural History Collections, Taxonomic Data Working Group, and iDigBio conferences and workshops, participation in the Specify Consortium Board of Directors and scientific and technical advisory boards.

We have not previously engaged with natural science collection institutions in other African countries. This was largely because the focus over the last six years has been on establishing the NSCF structures and having tangible products and skills that can be shared and have a meaningful impact. Curation and research staff at natural science museums in other African countries will be contacted to consider opportunities for knowledge sharing and collaboration. The possibility of an online African natural science collections symposium, participation in various NSCF online activities such as the collection management and curation course, and the Communities of Practice will be explored.

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

Strategy 1. Staffing and capacity development

- The NSCF has run training in the use of Specify software for managing collections and data, and a higher level mentorship programme for staff. The NSCF sponsored 17 staff to attend a customised Data Management course presented by the University of Pretoria. Various other workshops related to data management and use have been run by the NSCF or participation in workshops organised elsewhere has been supported. This type of work will continue.
- The NSCF collection management and curation course material will be reviewed and refined and be available online for independent study. More focussed shorter courses will be offered or participation supported over the next six years.
- The Community of Practice approach will be used for increasing capacity for collection and data management and curation. The NSCF will facilitate the establishment of these sessions.

- Emerging leaders from the participating institutions have been identified and a range of activities will be run to support the development of this component of the collections community.
- The NSCF Hub team includes 17 staff, 16 of who are on short term contracts. Ensuring team cohesion, staff well being and ongoing development is critical for the successful implementation of the NSCF.

Strategy 2: Transformation and organisational strengthening to enable the long-term sustainability of the collections and associated research to benefit society

The initial aim of the transformation process was to build a sustainable and functional NSCF network, with full participation and collaboration across institutions, recognising the African and South African context.

We have run a facilitated transformation and organisational strengthening process over the last six years. There was considerable focus on institutional leadership and this has had mixed impacts which is not unexpected given the diversity of governance structures, cultures, size and staff complements. The challenges that need to be addressed are complex and so the transformation and organisational strengthening work will continue but with a more targeted approach.

The collections assessment that was carried out in 2023 was designed as a transformative change process that included strengthening the NSCF network, information sharing, capacity development through engagement with the content of the NSCF Collections Management & Curation Manual and organisational development. Through the assessment process, the reports and regional sense-making workshops, some of the underlying factors that contribute to institutional challenges or achievements have become evident.

- The focus of the transformation and organisational strengthening process for the next five years will be on supporting selected institutions with specific challenges that were identified during the collections assessment process, and supporting institutions with planning and implementation for collection management and curation.
- Communication across the institutions includes regular use of a WhatsApp group and a Facebook page, which will both continue.
- The NSCF Forum will be held every 18 months but this is likely to be a virtual event to reduce the costs.

Strategy 3: Contributing to the identification of strategies and models that will ensure financial sustainability of the natural science collections.

As allocations from government and higher education institutions continue to decline, pressure to increase efficiencies is increasing. There are limited opportunities for commercial activities associated with the collections, but sharing knowledge and resources across institutions, and potentially rationalising some collections will be continuously investigated over the next six years.

3. Progress: 1 April to 30 September 2025

Strategic Objective	2025/26 Deliverables	Progress 1 April to 30 September 2025
1. Securing Collections	- Transfer of orphaned collections to secure institutions	On Track University of Zululand Herbarium specimens relocated to Bews Herbarium, UKZN, and integration started. Malawi Fish Collection expected to arrive at South African Institute for Aquatic Biodiversity in December 2025.The NSCF Funding panel also allocated funds to 5 partner institutions for the relocation and incorporation of 9 orphan collections into institutions with sufficient capacity and resources to care for the collections.
	- Communities of Practice for sharing best practices in curation	On Track 7 sessions held across 3 Communities of Practice: Invertebrate Imaging, Plant Identifications, Documentation Development.
	- Tracking of progress in implementing best practices for collection management and curation	On Track Implementation of collections management standards and practices within collections are progressing steadily. Since the launch of The NSCF Collection Status Tracking Tool in November 2024, the average implementation percentage across all partner collections has increased from 41% to 62%.
2. Upgrading and Expanding Databases	- 100,000 specimen records captured/upgraded	Achieved Partner institutions reported a total of 35,940 new specimen records captured from April to September 2025.
	- Tracking tool developed for monitoring progress of data capture, upgrading and publishing	On Track Tracking Tool Dashboard developed, refinements in process.
	- Publication of five collection data sets on GBIF	Achieved Partner institutions published 5 data sets to GBIF with assistance from the NSCF Hub where required:

Strategic Objective	2025/26 Deliverables	Progress 1 April to 30 September 2025
		- Skukuza Biological Reference Collection Coleoptera dataset (SANParks). - Skukuza Biological Reference Collection Ornithology dataset (SANParks). - Skukuza Herbarium dataset (SANParks). - Kimberley South African National Parks Herbarium dataset (SANParks). - KwaZulu-Natal Museum Myriapoda Collection dataset.
	- Community of Practice for data management – regular sessions	Delayed, in progress First session on data management held in November 2024. Sessions will be resumed with appointment of Specimen Database Coordinator.
3. Virtual Museum	- Uploading of all new images and data and archival documents onto Virtual Museum	Delayed, in progress The Virtual Museum setup and launch is delayed, due to challenges with the architecture hosting, however this is being addressed. Virtual library created and ready for deployment once architecture hosting issues are resolved.
	- Monitoring use of the specimen images and digitized documents	Delayed, in progress To commence once architecture set up is complete. Metadata standards for images and documents developed.
	- Specimen imaging of 500 vertebrates, fossils, 160,000 plant specimens	On Track 192,296 plant specimens imaged, 423 vertebrate and fossil type specimens imaged from April to September.
	-Digitisation of archival documents related to collections: 100 documents	Achieved 111 archival collections documents imaged at Agricultural Research Council – Plant Health and Protection.
	-Investigating technology for mass digitisation of insect specimens	On Track Investigation of appropriate mass insect specimen imaging system underway.
	- 100 publications produced by researchers using collections	On Track

Strategic Objective	2025/26 Deliverables	Progress 1 April to 30 September 2025
4. Research Outputs and Impact	- 100 new species described from the collections - 200 scientists visiting the collections for research purposes - 50 loans of specimens sent out for research - 25 MSc, PhD and Postdocs using collections for their research - use of collections for identification of biological specimens	April to March 2025: - 84 papers published - 54 new species described - 413 national visitors - 112 international visitors - 2,954 specimens sent out on loan - 154 postgraduate students using the collections - 253,390 specimens identified
	- Assessment of use of research outputs from collections and impact on society	Delayed, in progress Initial session with community held during Forum in March, follow up session planned. Development of an NSCF dashboard that visualises key impact indicators derived from GBIF-published datasets from the NSCF network is almost complete and will be launched in the next reporting period. The dashboard will benchmark and support evidence-based reporting on societal and scientific impact of published collections data both for the NSCF as a whole and the individual institutions.
5. Outreach and Communication	- Development of video materials on collections and iconic specimens	Delayed, in progress Pilot video produced, editing stage underway. A revised strategic direction has been proposed to build upon the outcomes of the pilot initiative. This direction is currently under consideration, with exploratory consultations and concept development in progress to ensure full alignment with institutional priorities, communication objectives, and the forthcoming phase of the NSCF.
	- Development of a framework for promoting public engagement and understanding of the value of natural science collections	Delayed, in progress While preparatory work has been initiated, progress has been slower than anticipated. We remain committed to completing the task and have revised the implementation timeline.
	- Promote NSCF at outreach events	On Track - Participated in the Ezamazwe IST Expo 2025, held on 16 April 2025 at Lenyenye Stadium in Tzaneen. The event targeted high school learners

Strategic Objective	2025/26 Deliverables	Progress 1 April to 30 September 2025
		(Grades 9–12), undergraduate students, recent graduates, township SMMEs, young professionals, and unemployed youth, with an estimated attendance of 500 participants. The NSCF delegation of two representatives engaged attendees through exhibits and discussions highlighting the value of natural science collections for education, research, and career development.
	- Maintenance and regular posts of news items on the NSCF website and Facebook page	On Track Website and Facebook page maintained with current information and news items, weekly updates.
	- Monitoring and analysis of views and visitors to online platforms	On Track Website views: 67,567 Website visitors: 48,753 Facebook page followers: 1,026 Instagram followers: 314 Twitter (X) followers: 251 LinkedIn followers: 194 Facebook group members: 450 WhatsApp group members: 158
6. African and International Engagement	- Participation in international conferences, Specify Software Consortium	On Track - Specify consortium country membership renewed and participated in committee meetings (Technical Advisory Committee and Board meetings).
	- Invitations to African natural science collection institutions to participate in NSCF online activities / new collaborative activities	On Track List of possible contacts compiled. Initial engagements through G20 Research and Innovation Working Group, and CBD Sub-Regional Technical and Scientific Cooperation (TSC) Support Centre.
Governance & Networking	- Meetings of Advisory Committee (twice a year); Co-ordinating Committee (3 times a year)	On Track Advisory Committee meeting scheduled for November 2025, Coordinating Committee meetings held in February and July 2025.
	- Six monthly and final report to DSTI; quarterly report to SANBI EXCO / Board.	On Track

Strategic Objective	2025/26 Deliverables	Progress 1 April to 30 September 2025
		Six monthly reports submitted to DSTI, and quarterly reports submitted to SANBI (EXCO/Board).
	- Develop new Collaboration Agreements / addenda with partner institutions.	Achieved Collaboration agreements renewed with all 19 partner institutions.
Enabling Strategy: Capacity Development	- Training courses in data management and Virtual Museum tools	On Track Will commence once the Virtual Museum is launched and the Specimen Database Coordinator post is filled.
	- Review and revision of materials for NSCF Collections Management & Curation Course	On Track Revision of materials in progress.
	- Emerging leaders development (32 staff from participating institutions and the NSCF Hub).	On Track Building on the success of the 2024 pilot immersion workshop, a total of 30 participants attended the May 2025 workshop, representing a diverse range of institutions within the NSCF network. A third workshop is planned for November 2025.
Enabling Strategy: Staffing	- Team and individual development of the NSCF Hub and institution-based staff	On Track Data Quality Specialist attended Digital Imaging for Biodiversity Collections Course hosted by the iDigBio Digitisation Academy from 4 to 7 August 2025. Collection Management Coordinator attended the Society for the Preservation of Natural History Collections virtual conference from 27 to 31 May 2025.
Enabling Strategy: Transformation and Organisational Development	- Interventions at selected institutions to support organisational strengthening	On Track First intervention engagement session held with Agricultural Research Council – Plant Health and Protection – in September 2025. Sessions with two other institutions planned for November and December 2025.

Strategic Objective	2025/26 Deliverables	Progress 1 April to 30 September 2025
	- Communication platforms for the NSCF network – website, Facebook page, WhatsApp group.	On Track Website, WhatsApp group, Facebook page and group, Instagram and Twitter accounts operational, news circulated via mailing list regularly, on an ad hoc basis.

4. Financial analysis

Income:

The grant for the 2025/26 financial year was transferred to SANBI's bank account in September 2025. The **total project income to date is R162,338,065.**

Expenditure to date is R146,864,572:

- Human Resources and support services costs amounted to R65,403,325.
- Non HR Operational Costs totalled R48,751,414.
- Capital Expenditure amounted to R32,709,833 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. This also included procurement of imaging equipment for specimen photography and archival document digitisation.

We have accrued R7,896,341 in interest to date.

5. Financial information

A detailed financial report for the project (provided by SANBI's Finance Division and approved by the Director, Finance), is provided. This report forms the basis of the financial information presented below on income, expenditure and commitments for the 2025/26 financial year:

Budget vs Expenditure:

Period: 2025/2026

Description	Budget Allocation						Actual				
	2021/22	2022/2023	2023/2024	2024/2025	2025/2026	TOTAL	2021/22	2022/2023	2023/2024	2024/2025	2025/2026
Opening Balance						-	**10 442 626**	**13 624 648**	**6 574 310**	**9 511 310**	**13 750 608**
Opening Balance							10 954 433	13 611 316	6 619 185	9 511 310	13 750 608
Prior period adjusted							-511 807	13 332	-44 875	-	-
Income	**18 971 020**	**19 065 285**	**18 215 100**	**19 082 102**	**19 051 674**	**94 385 181**	**19 461 402**	**10 597 974**	**19 371 919**	**19 961 834**	**19 514 128**
Grant	18 971 020	19 065 285	18 215 100	19 082 102	19 051 674	**94 385 181**	18 971 020	10 000 000	18 215 100	19 082 102	19 051 674
Interest earned							490 382	597 974	1 156 819	879 732	462 454
Expenditure	**18 971 020**	**19 065 285**	**18 215 100**	**19 082 102**	**19 051 674**	**94 385 181**	**16 292 712**	**17 603 438**	**16 434 919**	**15 722 537**	**9 894 900**
Human Resources and Support Services	**10 177 850**	**11 834 252**	**12 473 363**	**6 208 111**	**6 611 638**	**47 305 214**	**9 721 849**	**9 979 051**	**8 674 183**	**10 332 047**	**4 787 350**
Operational Expenditure	**5 171 789**	**5 331 033**	**5 041 737**	**9 051 787**	**8 973 933**	**33 570 279**	**3 297 371**	**5 105 937**	**5 951 283**	**5 235 790**	**4 780 879**
Training & research support (including workshops)	1 348 320	1 400 000	1 326 610	2 700 000	2 700 000	**9 474 930**	34 456	79 810	93 348	256 775	495 430
Fixed annual operational cost	50 000	690 000	1 037 140	3 258 233	3 308 766	**8 344 139**	702 160	1 477 577	1 322 552	830 152	800 412
Travel & accomodation	760 000	471 769	590 000	985 344	880 000	**3 687 113**	208 238	1 108 689	1 672 725	1 363 420	1 174 687
Consumables for office, collections upgrades	1 116 449	862 736	266 477	200 000	180 000	**2 625 662**	455 416	1 439 861	1 041 148	877 231	405 182
SANBI overheads charge (10%)	1 897 020	1 906 528	1 821 510	1 908 210	1 905 167	**9 438 435**	1 897 102	1 000 000	1 821 510	1 908 210	1 905 167
Capital Investments	**3 621 381**	**1 900 000**	**700 000**	**3 822 204**	**3 466 103**	**13 509 688**	**3 273 492**	**2 518 449**	**1 809 453**	**154 700**	**326 671**
Webservers & networking	3 470 070	1 300 000	500 000	3 181 204	2 518 852	**10 970 126**	3 273 492	2 518 449	1 809 453	154 700	326 671
Equipment				80 000	947 251	**1 027 251**					
Workstations	151 311	600 000	200 000	561 000		**1 512 311**					
Closing balance							**13 611 316**	**6 619 185**	**9 511 310**	**13 750 608**	**23 369 835.03**
Less total interest accumulated to dated											**- 7 896 341**
Total balance as at 30.09.2025											**15 473 493.99**

Financial summary:

Total Project Income	**R162,338,065**
Total Project Expenditure	**-R146,864,572**
Balance	**R15,473,493**

*R7,896,341 interest earned not included in the table above

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, 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.

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

Item	Expected date of finalisation	Amount
Short term contract staff at institutions (research assistants)	December 2025	R43,200
Service provider for website maintenance and technical support	May 2026	R89,674
Service provider for organisational transformation and development process	March 2027	R2,400,345
Collaboration agreements with partner institutions	February 2026	R1,306,477
TOTAL		**R3,839,696**

Staff contracts for 20 NSCF Hub staff appointed at SANBI and at institutions (dependent on funding)

Item	Expected date of finalisation	Amount
Staff contracts	January 2028	R12,942,487
TOTAL		**R12,942,487**

6. Summary and assessment

Achievements 1 April to 30 September 2025:

1. Integrated monitoring

Integrated monitoring of outputs from the use of the collections has been carried out, and illustrates the value of the collections as research infrastructure: 135 requests for data serviced, with 28,267 specimen records provided; 413 national visitors and 112 international visitors using the collections; 54 new species described using the collections; 84 peer-reviewed papers where the collections were used published; the number of postgraduate students who used the collections was 154 (note that the same student may be counted more than once if they used more than one institution's collections). Eighteen institutions submitted reports through the online monitoring system. Institutions reported the following outputs from April to September 2025:

Indicator	Q1	Q2	Year Total
Orphan collections: no. of specimens incorporated	0	498	**498**
New specimens accessioned	13167	354436	**367603**
Number of DNA samples added	0	55	**55**
Number of tissue samples added	75	539	**614**
Number of DNA samples supplied for research purposes	266	250	**516**
Data provided to external users: no. of requests	63	72	**135**
Data provided to external users: no. of records	12131	16136	**28267**
Number of new specimen records added to Brahms/Specify	24003	11937	**35940**
Number of specimens imaged	17211	19544	**36755**
Number of specimens sent out on loan for research	1893	1061	**2954**
Number of visitors using collection (national)	221	192	**413**
Number of visitors using collection (international)	68	44	**112**
Number of new species described	23	31	**54**
Number of papers published based on collection	48	36	**84**
Number of papers open access	28	26	**54**
Number of specimens identified: external stakeholders	15460	237930	**253390**
Number of outreach activities held	65	58	**123**
Number of learners/attendees exposed to the activity	10968	3531	**14499**
Number of postgrad students using the collection	83	71	**154**
Number of students trained in the collections	23	14	**37**
Number of students graduated from using the collections	1	1	**2**
Number of Biodiversity Management and Policy Input Activities	2	2	**4**

These figures illustrate the extensive use of the collections and associated services, and the high number of outputs.

2. Translational outputs

The collections continue to serve as a national **reference for the identification of materials** across multiple sectors. In **agriculture**, they underpin the accurate identification of crop pests, livestock disease vectors and parasites, weed biocontrol agents, and phytosanitary diagnostics that enable the safe import and export of produce. In **health**, they support diagnostic work such as investigating outbreaks (for example, head lice in schools), while in **environmental planning and management** they provide the basis for environmental impact assessments in development applications.

The collections were also used extensively in postgraduate research and by researchers in a number of different disciplines, and for the general public. Between April and September 2025, **253,390 specimens have been identified**. Without accurate identifications, the consequences can include crop and livestock losses, international trade restrictions, or the loss of biodiversity through poorly informed development.

3. Input into biodiversity management/policy activities

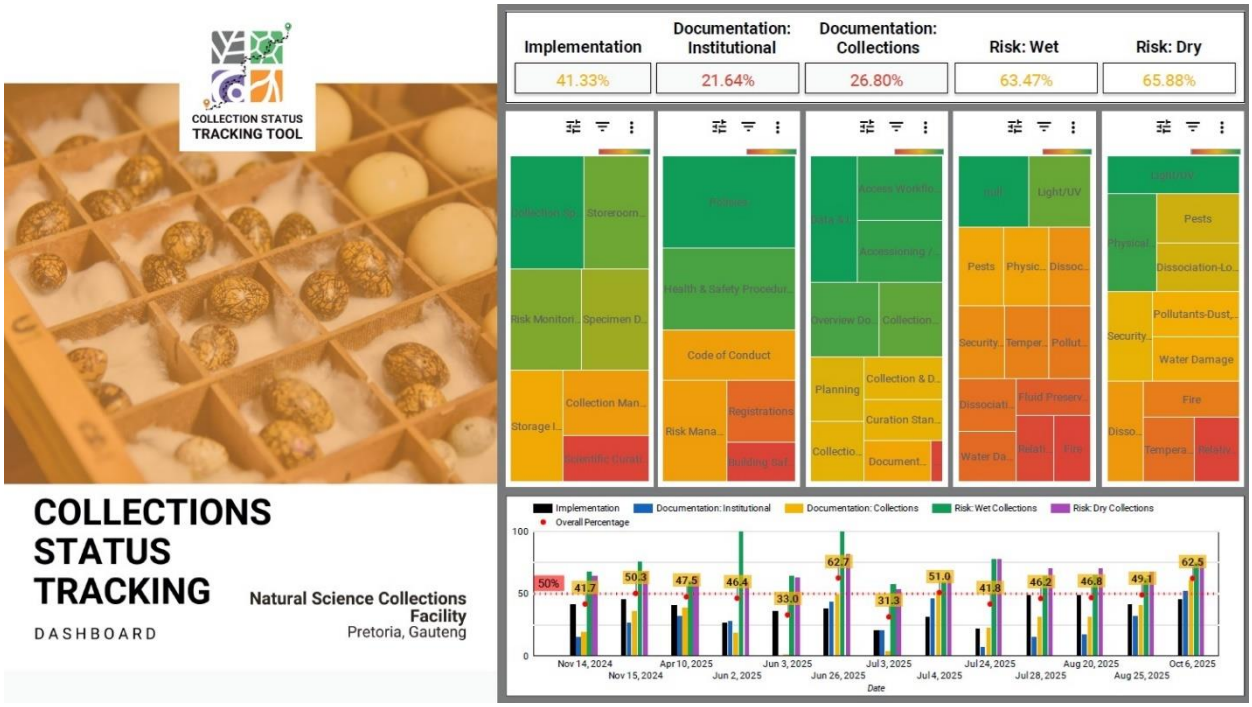
Staff from partner institutions provided input into a range of biodiversity management and policy initiatives such as providing, assessing and reviewing biodiversity data for the Mammal Red List Assessment, eThekwini Draft Biodiversity Protection By-Law and the Eastern Cape State of the Environment Report.

5. Contribution to the Mpumalanga Roadmap under South Africa's G20 presidency

The NSCF played a prominent role in supporting South Africa's hosting of the 2025 G20 Research and Innovation Working Group (RIWG) process, particularly the Seminar and Workshop on *Developing Global Collaborations to Support Museums and Natural History Collections*, held at the University of Mpumalanga. The NSCF Lead delivered a keynote presentation titled *"Unlocking Value Through Collaboration: Lessons from South Africa's Natural Science Collections Facility"*, showcasing the country's distributed network model and its contribution to ethical and inclusive data mobilisation. Together with representatives from NSCF partner institutions, the Facility contributed to the development of the *Mpumalanga Roadmap for Advancing Global Collaboration in Natural History Collections*, which sets out priorities for international coordination, digitisation, capacity development, and equitable benefit-sharing. The seminar and workshop were attended by national and international representatives of governments, research infrastructures, museums, and funding agencies. The NSCF's organisational development consultants designed and facilitated the participatory process that harnessed collective knowledge to inform the roadmap, ensuring a coherent and inclusive outcome. Several transferable NSCF tools and models were recognised that could be applied in other national and regional contexts, these include its facilitation-based governance framework for distributed research infrastructures, the co-developed national standard for collection management (NSCF Manual), the action learning collections management curriculum, the guided self-assessment and tracking system for collection status and prioritisation, standardised imaging and digitisation protocols, and its people-centred organisational development approach. Several synergies were also identified between the NSCF's work and that of other international natural science infrastructure initiatives.

5. Improvements in collections management and curation

A **Collections Status Tracking** Tool was developed by the hub team to assist institutions in tracking progress with implementation of collections and data management practices and standards from a baseline situation based on the result from the collections assessments. The roll-out of the tool to institutions continued and serves as a valuable resource to track improvement in collection care and ensuring collection infrastructure is appropriate for safeguarding collections. Since the inception of the tool the **overall implementation percentage across institutions increased from 41% to 62%**. This shows an overall improvement in the management of risks to collections and the development of collection care documentation to ensure professional and scientifically credible practices. The Tool provides institutions with a structured way to monitor and demonstrate improvements, enables collection professionals to track and share outcomes of their work, and supports the NSCF network through shared data that highlights progress and areas needing attention.



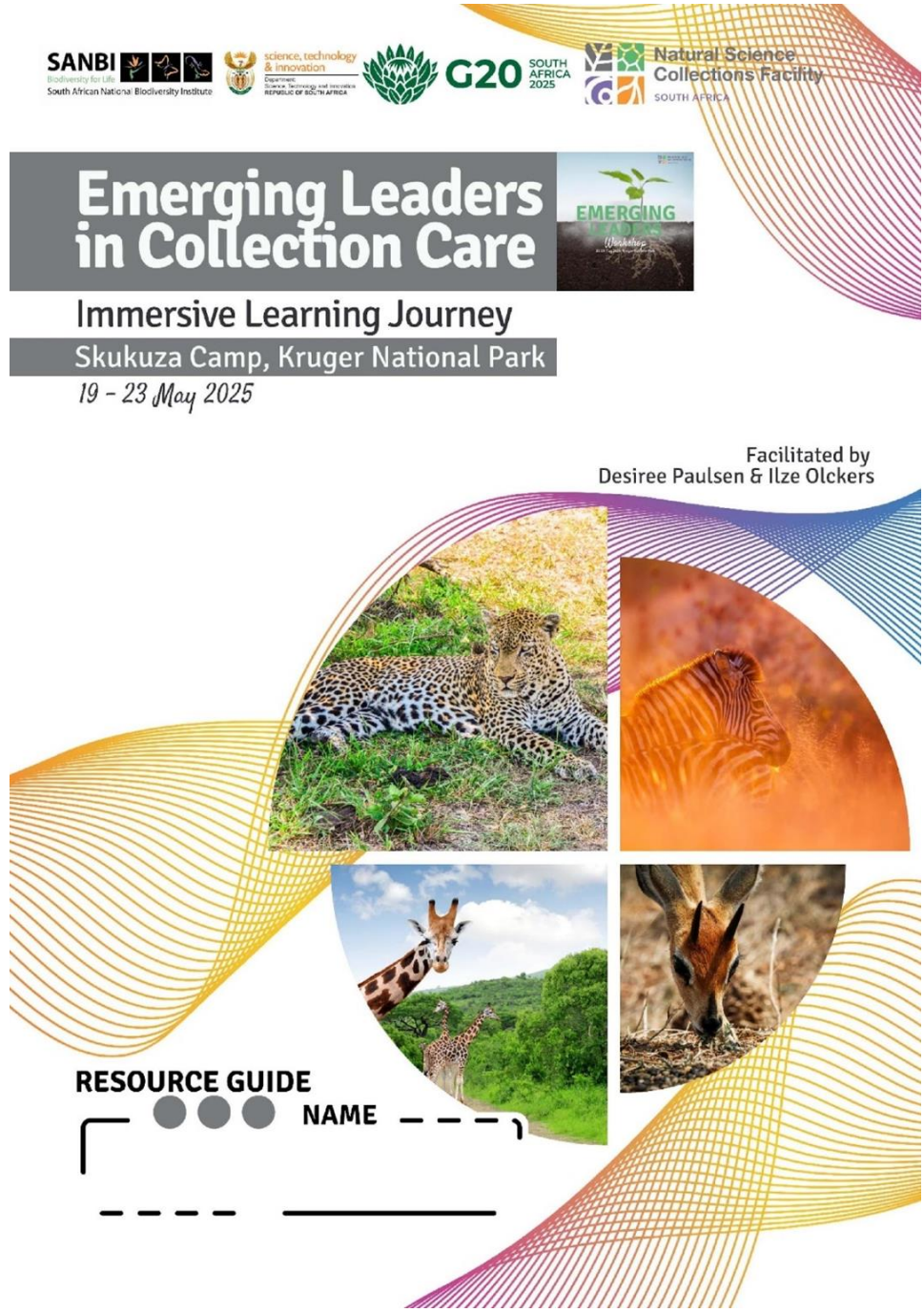
Collection Status Tacking Tool Interface

6. Emerging leaders development

Working with the outcomes of the assessments and implementation of standards and SOPs across institutions requires that new ways of working are designed and piloted, and through a reflective process, revised or modified, taking into account each institution's unique challenges, culture and background but also the need to work as a community of practice. The previous transformation contracts have highlighted the important role that emerging young leaders within the institutions play in effecting change, and development of this community will be an imperative for this phase of the NSCF. The first session with 26 participants from partner institutions and the NSCF hub was held in Cape Town from 8 to 12 April 2024. The session was facilitated by the Organisational Development consultants and covered topics on complexity leadership applied to the NSCF context, competencies for driving change and social technologies for transformation, and participation in communities of practice for capacitation of natural science collection in South Africa.

Building on the success of the 2024 pilot immersion workshop, A total of 30 participants attended the May 2025 workshop, representing a diverse range of institutions within the NSCF network. A third workshop is planned for November 2025. Overall feedback indicates a high level of satisfaction with the Emerging Leaders Programme. Participants valued the quality of facilitation, the relevance of the content, and the opportunities for reflection and growth. The May workshop was broadly viewed as a meaningful and transformative experience that strengthened leadership confidence, collaboration, and self-awareness across the cohort.

The Emerging Leaders Programme has evolved into a replicable leadership development product that can be adapted by other institutions to strengthen organisational capacity and leadership culture. Through its immersive, reflective, and action-based learning design, participants develop confidence, practical tools, and a shared language of leadership that they take back to their institutions. This enables them to foster collaboration, improve team cohesion, and contribute to institutional transformation initiatives. The programme has also inspired greater engagement across the NSCF network, with participants stepping into leadership roles, initiating institutional interventions, and moulding a new generation of forward-looking collection professionals.



Emerging Leaders Workshop, Kruger National Park, 19-23 May 2025

7. Digitisation of specimens and archival documents for the Virtual Museum

The archival collection document digitisation project completed digitising historical documents at the **National Herbarium, SANBI.** The team moved to the **Agricultural Research Council, Plant Health and Protection**, on 1 July, and completed digitising 111 historical documents at this institution so far. A total of 1,149 historical documents have been digitised since the inception of this project in 2024.

The herbarium imaging team completed imaging the **Selmar Schonland Herbarium (Albany Museum),** this is the fourth largest herbarium in the country with 250,000 specimens now imaged. The team also successfully prototyped imaging of 3D plant specimens through stacking technology at this herbarium.

3D type specimens from Albany Museum photographed using stacking technology

Imaging of Karoo Palaeontology, mammal and bird type specimens at **Iziko Museums of South Africa** was completed, and imaging of herpetology type specimens is underway.

Type specimen images from Iziko Karoo Palaeontology collection

Imaging of type specimens in the national fish collection at **South African Institute for Aquatic Biodiversity** was completed with a total of over 2,400 type specimens imaged. In addition, the NSCF photographers contributed to curation and outreach work, and taking photographs of specimens for various publications.

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PENSOFT.

Systematic review of *Pseudobarbus burchelli* (Teleostei, Cyprinidae), with revalidation of *P. vulneratus* and description of a new species

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https://zoobank.org/9A070223-89C9-483D-BC98-2948E9C8BA9A

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REGULAR ARTICLE

JOURNAL OF FISH BIOLOGY

Review of the southern African slender stonebashers, genus *Heteromormyrus* Steindachner 1866 (Teleostei: Mormyridae), with description of six new species

Tadiwa I. Mutizwa[1,2] | Wilbert T. Kadye[1,2] | Pedro H. N. Bragança[2,3] | Albert Chakona[1,2]

Type specimen images and publications from SAIAB

8. Strategic rescue and incorporation of orphan collections

A core objective of the NSCF is to secure vulnerable natural science collections that lack the appropriate curatorial and resource capacity, preventing their decay, loss, or transfer overseas. In the current funding cycle, several key orphan and at-risk collections were identified and approved for transfer and incorporation into partner institutions with established infrastructure, curatorial expertise, and long-term sustainability. This initiative not only protects irreplaceable national heritage but also increases accessibility to these valuable resources for the global research community.

UniZulu and Bews Herbarium staff members packing up the collection for relocation

The following table summarises the recent collaborative agreements for the transfer and incorporation of at-risk collections:

Receiving Institution	Donating Institution / Source	Collection Type	NSCF Funding and Staffing Allocated	Significance of Collection
South African Institute for Aquatic Biodiversity (SAIAB)	Penn State University (USA)	Malawi Cichlid Fish	R350,000.00 2 x NSCF Hub curation technicians	Globally significant endemic fish from Lake Malawi.
KwaZulu-Natal Museum (KZNM)	McGregor Museum	Mollusc Collection	R160,000.00	Valuable non-marine mollusc material.
University of KwaZulu-Natal (UKZN) - Bews Herbarium	University of Zululand Herbarium	Herbarium Specimens	R80,000.00 1 x NSCF Hub curation technician	Resource-limited collection with high insect pest damage risk.
Compton Herbarium (SANBI)	Harold Porter (GHPG) & Karoo Desert Herbaria	Herbarium Specimens	R280,800.00 (includes funding for 3 x research assistants)	Consolidation of small botanical garden collections.
Iziko Museums of South Africa	Various Private Collections	Fossil & Entomology	R550,639.76 (includes funding for 4 x collections assistants)	Incorporation of private Klinger, Van Dijk (Fossil) and Ball (Entomology) collections.
National Institute for Communicable Diseases (NICD)	KZN and Mpumalanga Malaria Control	Mosquito (Disease Vector)	R193,896.00 (includes funding for 1 x collections assistant)	Collections of disease vector species valuable for medical entomology.
Lepidopterists' Society of Africa (LepSoc)	Various Private Collections	Butterfly/Lepidoptera	R170,000.00 (includes funding for 1 x data capturer)	Incorporation of private African butterfly specimens, some potentially extinct.
Total Funding Committed			**R1,748,335.76**	

South African Institute for Aquatic Biodiversity (SAIAB) The NSCF provided R350,000.00 for the repatriation and incorporation of the extensive Malawi Cichlid fish collection from Penn State University in the USA. Additionally the NSCF appointed 2 curation technical staff to assist SAIAB with the incorporation of the collection. This is a globally significant collection of endemic fish from Lake Malawi, collected from African waters. Its transfer to SAIAB, a leading African aquatic research institute, ensures its long-term preservation under professional curatorial standards and significantly enhances its accessibility for African researchers, particularly as the current US curator approaches retirement.

KwaZulu-Natal Museum (KZNM) Funding of R160,000.00 was allocated to facilitate the transfer of the mollusc collection from the McGregor Museum. This collection, which was inappropriately stored and lacked dedicated curatorial staff at the McGregor Museum, holds significant historical and scientific value, as some material was used in a major 1939 publication on South African non-marine Mollusca. The KZNM is the largest holder of mollusc collections in Africa,

ensuring the collection is moved to an environment with appropriate staffing, resources, and storage for its long-term care.

University of KwaZulu-Natal (UKZN) - Bews Herbarium The Bews Herbarium received R80,000.00 for the relocation and incorporation of the University of Zululand Herbarium collection, as well as a curation technician to assist with incorporation. The Zululand collection was suffering from visible insect pest damage due to the limited resources at the University of Zululand. The transfer ensures the collection is preserved in a safe environment, leveraging Bews Herbarium's proven track record and capacity in managing and curating significant provincial collections, preventing the critical loss of material.

Compton Herbarium (SANBI) A total of R280,800.00 was allocated to the Compton Herbarium to incorporate the collections from the Harold Porter Herbarium (GHPG) and the Karoo Desert Herbarium. This consolidation effort targets small botanical garden collections, bringing approximately 6,500 specimens into the main SANBI curatorial and data management system (BODATSA). This centralisation is a key step towards digital capture, scientific verification, and long-term security, ensuring these valuable botanical records are made accessible to researchers.

Iziko Museums of South Africa Iziko received R550,639.76 for the incorporation of three separate, important orphaned collections: the Klinger and Van Dijk fossil collections, and the Ball entomology collection. By transferring these privately held collections, often lacking stable long-term care, into the nationally mandated structure of Iziko, the NSCF ensures these specimens, including unique fossil and insect material, are integrated into the national network, curated to global standards, and made available for future scientific use.

National Institute for Communicable Diseases (NICD) Funding of R193,896.00 was approved for the relocation and curation of orphan mosquito collections from the KwaZulu-Natal and Mpumalanga provincial malaria control programmes. These collections, which contain approximately 2,000 mosquito species (including disease vector species), are a critical resource. Their integration into the Medical Entomology Museum at the NICD ensures they are maintained and readily accessible for ongoing research in public health, biosecurity, and medical diagnostics.

Lepidopterists' Society of Africa (LepSoc) A sum of R170,000.00 was granted to LepSoc's African Butterfly Centre for the incorporation of orphaned private butterfly collections. The centre manages a consolidated collection containing approximately 200,000 specimens, including representatives of nearly all South African butterflies, some of which may now be extinct. This funding supports essential activities like pest decontamination (using a new chest freezer) and specimen data capture, ensuring the long-term physical care and virtual accessibility of this irreplaceable entomological material.

Challenges:

1. Operational challenges. Recruitment, procurement, and agreement approvals are managed through SANBI systems, resulting in delays due to multiple layers of authorisation. A key challenge has been recruiting data specialists and other technical staff, given the scarcity of these skills and the short-term nature of NSCF contracts tied to the SANBI–DSTI funding agreement. While SANBI had previously agreed to three-year contracts following DSTI's confirmation of the NSCF as a long-term project, this arrangement has recently reverted to contracts limited to the funding period, creating additional challenges when recruitment occurs late in a cycle.

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 accountability and societal relevance across institutions remains a core challenge. Many collections and staff have historically worked in silos, focusing on internal priorities rather than collective outcomes, which limits the broader impact of research and the efficient use of resources. The new Organisational Development

contract aims to address institutional silos and strengthen a culture of collaboration, accountability, and societal service across the network. The work will focus on institution-level interventions, emerging leaders development, and cross-institutional learning processes designed to build resilience, reduce duplication, and maximise collective impact. Emerging leaders from partner institutions are being supported to champion and embed inclusive, outward-looking practices in their teams. This approach will complement other NSCF initiatives to further position the facility as a coordinated national system rather than a set of isolated institutions.

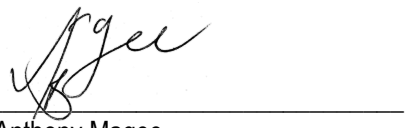
4. Institutional ownership and engagement. Building on earlier work to improve coordination and inclusivity across the network, the external review identified the need to deepen institutional ownership. Institutional engagement in strategic decision-making has at times been uneven. To address this, the Coordinating Committee undertook a structured review and agreed to trial various substructures to strengthen institutional participation and accountability. Furthermore, a challenge remains in ensuring sustained engagement and formal participation across all member institutions. While the network has strengthened collaboration, the full commitment of all partners remains tenuous, as evidenced by a lack of cooperation from some parties in critical network activities. This uneven buy-in introduces a risk of fragmentation, jeopardizing the vision of a fully integrated and collectively accountable national research infrastructure.

5. Development of an online virtual museum. Development of the online Virtual Museum has proven more complex than initially envisaged, particularly due to delays with system integration and hosting arrangements. However, significant progress has been made on other key deliverables to ensure readiness once deployment is possible, including selecting the Living Atlas software and ATOM platform, appointing a coordinator, and establishing centralised digital metadata and content repositories. The implementation timeline has been revised to accommodate these dependencies, ensuring that foundational elements are in place for a smooth rollout once hosting and access challenges are resolved.

6. Scaling and institutionalisation of NSCF initiatives. Several NSCF initiatives have shown strong results at pilot stage, demonstrating clear value and impact. The next challenge lies in scaling these initiatives by embedding them within institutional structures and work programmes. This requires institutional staff to be capacitated and for institutions to take ownership of implementing NSCF-aligned practices and targets.

Approval

Submitted by:



Dr Anthony Magee

NSCF Lead

Date: 30/10/2025

Approved by:

Prof Ramagwai Sebola

Chief Director, Foundational Biodiversity Science

Date: 31/10/2025