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C 3.5.3 Full proposal for an EDIT communication mechanism for cooperation and information exchange with other international organisations and/or networks

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Acronyms

ABIF	Australian Biodiversity Information Facility
ABRS	Australian Biological Resources Study
ALA	Atlas of Living Australia
AMBS	Australian Museum Business Services
AMRRN	Australian Microbial Resources Research Network
ANBG	Australian National Botanic Gardens
APC	Australian Plant Census
APNI	Australian Plant Name Index
AVH	Australia's Virtual Herbarium
BIOTICA	Biótica Information System
CAMD	Council of Australian Museum Directors
CANB	Australian National Herbarium
CERF	Commonwealth Environment Research Facilities
CHAEC	Council of Heads of Australian Entomological Collections
CHAFC	Council of Heads of Australian Faunal collections
CHAH	Council of Heads of Australian Herbaria
CONABIO	National Commission for the Knowledge and Use of Biodiversity
CPBR	Centre for Plant Biodiversity Research
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAFF	The Australian Government Department of Agriculture, Fisheries and Forestry
DEWHA	The Australian Government Department of the Environment, Water, Heritage and the Arts
ECBOL	European Consortium for the Barcoding of Life
EDIT	European Distributed Institute of Taxonomy
EoL	Encyclopedia of Life
ERIN	Environmental Resources Information Network
GBIF	Global Biodiversity Information Facility
IBIS	Integrated Botanical Information System
IPNI	International Plant Name Index
NCRIS	National Collaborative Research Infrastructure Strategy
OZCAM	Online Zoological Collections of Australian Museums
REMIB	World Biodiversity Information Network
SANBI	South African National Biodiversity Institute
SNIB	National Information System on Biodiversity
TRIN	Taxonomic Research and Information Network (a CERF research hub)

Executive summary

In addition to using the support, coordination and recognition of taxonomic basic research from EDIT partners, EDIT can also benefit from the experience of international role model networks and/or institutions for the design of its infrastructure and organisation process. This can be achieved by establishing liaisons with international organisations and/or networks, and by improving communication mechanisms and commitments through multilateral MoU's/agreements.

The present proposal outlines a communication mechanism for EDIT cooperation and information exchange with networks of excellence in taxonomy and/or biodiversity in Australia (ABRS (includes facilitating communication with collections councils), ALA, and TRIN), Mexico (CONABIO) and South Africa (SANBI). These networks and/organisations, like EDIT, are also concerned with finding ways to enhance the critical mass of taxonomic expertise and create synergy in their own countries.

The aim of this proposal is to learn from the experience of the five organisations and/or networks, while dealing with scientific, technological and ICT issues; and to establish communication with them. For this purpose information is provided regarding generalities, responsibilities, collaboration and cross-program initiatives, infrastructure, and contact details. In addition, the results of a questionnaire sent to the directors is presented showing views on decision making and functioning, communication mechanism, and possibilities for future collaboration with EDIT.

The five organisations and/or networks have unanimously expressed their interest in engaging with EDIT to collaborate in different areas by establishing formal commitments. They perceive collaboration with EDIT and research global initiatives (e.g., DNA Barcoding and regional biodiversity inventories) as a means of avoiding duplication of effort and achieving efficiency in resource use across their own countries and Europe. Potential topics for collaboration include:

- ABRS is the national focal point for taxonomy in Australia. It fulfils a role within the Australian Government of representing taxonomy and biological collections at a policy level. ABRS facilitates communication and partnerships between a wide range of research, industry and government stakeholders, including the peak collections councils of Australia. It also has a knowledge delivery role, making taxonomic information publicly available, and a funding role, through the National Taxonomy Research Grant Program.

  ABRS is very much interested in establishing a communication mechanism with EDIT for sharing taxonomic expertise, exploring joint projects, creating exchange programmes for training taxonomists (Australia is running out of undergraduate courses in taxonomy), and facilitating loans collections. ABRS has funding available and would also like to forge joint projects and/or communication between Europe and Australia, and obtain international support to emphasise to the Australian government the importance of taxonomy. Potential areas where collaboration might be fruitfully pursued are botanical and zoological exchange, on-line learning, fieldwork and biological survey, research grants and publication issues.

- The ALA is being developed to provide ready access to the data (taxonomy, specimen data, images and profile information) held in biological collections across Australia. It will be an authoritative, freely accessible, distributed and federated biodiversity data management system that links Australia's biological knowledge with its scientific reference collections and other custodians of biological information. It will create opportunities to engage with other data and institutions.

  ALA and EDIT could compare the architectures for managing the integration of tools.

- TRIN aims to enhance and accelerate taxonomic research and delivery of information on Australia's biodiversity by addressing gaps in taxonomic knowledge of the Australian biota and building taxonomic capacity for effective environmental management. For this purpose, it will use the latest and best practice methodologies and techniques; manage and distribute the knowledge using novel, effective web-based platforms; and train the next generation of Australia's taxonomists. This will include taxonomic frameworks to access data, alternative pathways to data, and on-line systems for biodiversity identification.

EDIT and TRIN have parallel objectives and activities. Instead of duplicating efforts, both initiatives could help and complement each other.

- SANBI is the national coordinator of South Africa's biodiversity science. SANBI is one of the leading institutions in Africa with a charge for biodiversity management, facilitating conservation, sustainable use of living resources, and human wellbeing. This covers the promotion of sustainable use, conservation, appreciation and enjoyment of the exceptionally rich biodiversity of South Africa, for the benefit of all people. The Institute's responsibilities incorporate the full spectrum of South Africa's fauna and flora, and builds on internationally respected programmes in conservation, research, education and garden visitor services. It is responsible for collecting, generating, processing, coordinating and disseminating information about biodiversity and the sustainable use of indigenous biological resources, and the establishment and maintenance of databases in this regard. The Institute is further responsible for reporting on the status of the country's biological diversity; the status of all listed invasive species; the conservation status of all listed threatened or protected species and listed ecosystems, and the impacts of any genetically modified organisms that have been released into the environment. SANBI has a strong focus on the coordination and promotion of the taxonomy of South Africa's biodiversity. The Institute is increasingly expanding its reach into faunal natural history collections and zoosystematics, through establishing a managed network of partner institutions. SANBI also manages, controls and maintains all national botanical gardens.

  Potential areas where collaboration might be fruitfully pursued with EDIT are the analysis of mega-datasets on southern African flora, digitisation and electronic dissemination of taxonomic products, role of taxonomy and collections in global change research and postdoctoral and staff-twinning programmes.

- CONABIO is dedicated to promote, coordinate, support and develop activities aimed at knowing, preserving and using in a sustainable manner the biodiversity in Mexico. It also supports projects and studies focused on the knowledge and sustainable use of biodiversity, and undertakes special projects. Among its major achievements are the consolidation of the National Information System on Biodiversity (SNIB), the creation of the World Biodiversity Information Network (REMIB) and the development of an information system (BIOTICA) especially designed to handle curatorial, nomenclatural, geographic and bibliographic data.

  CONABIO is interested in learning more about the technology that EDIT is, or will be, using; how is its engagement with stakeholders (especially non-taxonomists); getting involved in projects dealing with climate change issues (for this purpose it will use the vast amount of data that is already available, however, it will require international expertise on climate model analyses).

In preparing this document we experienced the necessity of an authoritative front desk mechanism within EDIT which is more structured than the present situation. Based on the findings of the present study (see questionnaires), a follow up of the pros and cons of potential communication mechanisms should be explored.

This proposal itself is the first of a series of proposals that will be presented, based on the further establishment of additional contacts and meeting agendas with other networks of excellence within Europe and South/North America or East Asia.

1. Introduction

By initiating transnational projects and promoting collaborative research with role model international infrastructures, EDIT could strengthen its scientific, technological and ICT capacities. Additionally, EDIT could enhance the function of Europe's natural history collections as an integrated research facility, and hence the integrating scientific role of systematics. The present proposal outlines a communication mechanism for EDIT for cooperation and information exchange with five international networks contacted and visited in the frame of WP3.5 in 2008. The mechanism is especially based on the experience of institutes in Australia, Mexico, and South Africa, three countries which have integrated their collection and research capacity into one national organisation and/or network.

In Australia, the Australian Government has committed substantial funding to research infrastructure and the development of strategic research priorities across the country. Through the establishment of the Australian Biological Resources Study (ABRS), national research in taxonomy has been funded for the past 34 years (Chapter 3). Recently, the Commonwealth Environment Research Facilities (CERF) has provided funding for building a national taxonomy research hub known as the Taxonomic Research and Information Network (TRIN) (Chapter 4). This hub is established to enhance and accelerate taxonomic research and to generate and transfer information on Australia's biodiversity and biota by addressing gaps in taxonomic knowledge and building taxonomic capacity for effective environmental management. Additionally, the National Collaborative Research Infrastructure Strategy (NCRIS) has identified biological collections as key research infrastructure and provided funding through this program to develop an Atlas of Living Australia (Chapter 5).

In South Africa, the South African National Biodiversity Institute (SANBI) is the national coordinator of South Africa's biodiversity research and has a strong history in systematics and biodiversity collections based studies dating back more than a century ago (Chapter 6). Amongst others, functions include advice to the government on the management and conservation of biological diversity, within an environment that is rapidly changing in response to urban pressures and climate change, and on the sustainable use of indigenous biological resources.

In Mexico, the National Commission for the Knowledge and Use of Biodiversity: CONABIO (Chapter 7) has become an organisation that contributes significantly to decision making and to the establishment of policies regarding the conservation and sustainable use of biodiversity. With its achievements CONABIO has demonstrated the benefits of high quality, georeferenced and professionally maintained information systems of specimens and has proved to society that taxonomic work is not only essential to the existence of biological sciences, but has become an indispensable tool for the conservation and correct use of the natural resources.

A workshop meeting was organised on October 15 2008, in Copenhagen, involving EDIT partners, ABRS, ALA, TRIN, CONABIO, SANBI and other international organisations and/or networks (Bio-NET-INTERNATIONAL, Life Watch, ECBOL, EoL and GBIF) interested in establishing cooperation with EDIT. The purpose of the workshop was to identify areas with overlap of interests, discuss collaboration, and develop further initiatives to share resources and tools. For additional information see EDIT article EDIT Workshop on International Collaboration (Sierra & Roos 2008 in http://www.e-taxonomy.eu/files/newsletter12.pdf) and EDIT WP3.5 Workshop Report on International Collaboration (soon available as download).

In 2009, EDIT and potential international partners will work out projects and link them to specific funding possibilities (with the support of EDIT WP3.5). As a result, various specific MoU's for cooperation with other organisations and/or networks will be set up.

Additional contacts and meeting agendas with other networks of excellence and international networks within Europe and South/North America or East Asia will be further established.

2. Methodology

For establishing an EDIT communication mechanism for cooperation and information exchange with other international networks and infrastructures a questionnaire was distributed among the directors of three networks and/or institutions: ABRS, CONABIO and SANBI. The questionnaire addressed the following topics: i. Decision making and functioning, ii. Communication mechanism, and iii. Possibilities for future collaboration with EDIT. Site visits in Australia, Mexico and South Africa were made to the following infrastructures: ABRS, ALA, Australian Museum, TRIN (including the Centre for Plant

Biodiversity Research and the National Herbarium), CONABIO and SANBI. The information presented here was obtained by interviews with directors or their representatives, scientific and technical teams; from annual reports; power point presentations; and websites.

3. Australian Biological Resources Study (ABRS)

3.1 Background

The Australian Biological Resources Study (ABRS) is a programme established in 1973 by the Australian Government, within the Parks Australia Division of the Department of the Environment, Water, Heritage and the Arts (DEWHA).

3.2 Responsibilities

ABRS is the national focal point for taxonomy in Australia. It fulfils a role within the Australian Government of representing taxonomy and biological collections at a policy level. ABRS facilitates communication and partnerships between a wide range of research, industry and government stakeholders, including the peak collections councils of Australia. ABRS also has a knowledge delivery role, making taxonomic information publicly available via online, electronic media and hard-copy publishing, often in collaboration with other research organisations via public access systems. In addition, ABRS has a funding role, through the National Taxonomy Research Grant Program.

3.3 Collaboration and Cross-Program Initiatives

ABRS is actively involved in liaising with museums and herbaria, and their peak councils (the Council of Heads of Australian Faunal Collections - CHAFC, the Council of Heads of Australian Herbaria – CHAH, and the Council of Heads of Australian Entomological Collections – CHAEC) by representing their interests and raising common issues to the Australian Government (the national government). ABRS is also trying to establish new councils to represent microbial collections and universities teaching systematics more formally than the existing informal networks. It also offers international institutions and/or networks the nexus point for approaching Australian researchers on a national scale. ABRS provides grants for taxonomic research, totalling AU$1.9 million per year. These include research grants (including postdoctoral fellowships) and capacity-building grants such as Ph.D. and Honours/Masters Scholarships), bursaries for student travel, and the Australian Botanical Liaison Officer position. ABRS also offers contracts to taxonomic researchers to populate its online databases. ABRS provides taxonomic data to a wide range of users, and will be serving data to the Atlas of Living Australia (ALA, see Chapter 5). ABRS also provides support for the Australian Plant Name Index, part of the Integrated Botanical Information System (IBIS, see Annex 1).

As Australia is running out of undergraduate courses in taxonomy, with ABRS support, universities like U. Melbourne, U. Adelaide, and U. New South Wales are establishing a systematics network for cooperation among universities. It is recognised that this issue also requires effective international cooperation.

ABRS is very much interested in establishing a communication mechanism with EDIT for sharing taxonomic expertise, exploring joint projects, creating exchange programmes for training taxonomists, and facilitating loans collections, among others. It would also like to obtain international support to emphasise to the Australian government the importance of taxonomy.

3.4 ABRS's response to EDIT WP3.5 questionnaire

3.4.1 Decision making and functioning

1. *How are the decision making and functioning issues while being an individual institute?*
   a. *governance*
   Australian Government structure and reporting mechanisms in place.

   b. *cooperation and/or division of tasks*
   Cooperation with all taxonomic institutions in Australia (& with relevant overseas taxonomic experts) to facilitate preparation of taxonomic treatments for publication, and to fund taxonomic research.

c. *responsibilities*
ABRS has the national policy and grant funding role for taxonomy in Australia, including liaison with all stakeholders.

d. *priority setting*
ABRS national taxonomic research priorities are set in consultation with the Australian taxonomic community. The ABRS Advisory Committee assesses and approves grant applications based on national government research priorities.

e. *fund raising*
Government agency with funding provided by the Australian Government. ABRS seeks government and industry partnerships on behalf of the Australian taxonomic community to provide additional support for its grants program and other major national projects.

2. *Which problems or impediments did you encounter while developing a central organisation and while establishing joint goals?*
Set up in late 1970s/early 1980s within a pre-existing central organisation (DEWHA). In Australia, agreement between the Australian Government and State and Territory Governments can be challenging because of differing priorities and funding arrangements. The current model, where ABRS deals with institutional peak bodies (Council of Heads of Australian Herbaria, Council of Heads of Australian Faunal Collections and Council of Heads of Australian Entomological Collections) works quite well.

3.4.2 Communication mechanism

1. *How is the communication mechanism internally and externally organised (e.g., through a single or several departments or people)?*
Single Department. External communication via the above peak bodies and through university network.

2. *Does your institution and/or organisation have a front desk office (if not, what do you have instead)?*
No. Because of the geographic spread of institutions, a front desk is largely irrelevant and most communication is by email or phone. Website with contacts given for enquiries.

3. *How does the front desk office, website or department functions for:*
a. CBD issues, tenders, calls, and media contacts
DEWHA is the Australian Government lead on CBD issues and ABRS is the national focal point for Global Taxonomy Initiative issues under the CBD. ABRS normally provides briefings on taxonomy and collections related issues. Where these issues are contentious or new, ABRS would consult with the peak bodies in formulating a response. ABRS regularly receives a wide range of information and contacts nationally and internationally. This material is funnelled towards the peak bodies to ensure a wide distribution of information. Media contact is handled by DEWHA.

b. cooperative efforts
ABRS tries to develop all cooperative efforts through the peak bodies to promote a national approach to issues.

c. internal and external transfer of information
Internal communication is by face to face meetings. External communication is general by email or national face-to-face meetings or phone conferences. ABRS also spends a considerable amount of time and resources visiting individual institutions.

4. *How is the information disseminated (e.g., through research themes, expertise, etc.)*
Publication of taxonomic information in a range of forms (online, CDRoms, books, research papers). Supporting development of expertise. General communication and information through formal meetings or email.

3.4.3 Future collaboration

1. *We would like to know what your opinion is regarding cooperating with EDIT*
   We would be keen to develop a cooperative role between EDIT and ABRS as appropriate.

2. *What possibilities do you see that the EDIT consortium can link up with your institution and/or organisation, and with other international programmes?*

   The Atlas of Living Australia is being developed within Australia and will create opportunities for linking with other data and institutions. It will further the linkage of Australian data and institutions. We would seek opportunities to forge joint projects or communication between Europe and Australia centred on grant funding or sharing existing programs between Australia and Europe.

3.5 Contact details

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4. Taxonomic Research and Information Network (TRIN, a CERF research hub)

4.1 Background

The Commonwealth Environment Research Facilities (CERF) has recently provided funding for building a national taxonomy research hub. The hub is based in Canberra and will have a three year duration.

4.2 Responsibilities

The CERF hub has been created to enhance and accelerate taxonomic research and delivery of information on Australia's biodiversity by addressing gaps in taxonomic knowledge of the Australian biota and building taxonomic capacity for effective environmental management. New taxonomic data, an enhanced taxonomic information framework and a cohort of newly trained taxonomists will provide a sound foundation for future taxonomy in Australia.

Emphasis has been placed on significant, iconic and biodiverse groups which have not been tackled taxonomically, such as ants, mayflies and other aquatic macroinvertebrates, WONS (Weeds of National Significance) and small terrestrial vertebrates.

4.3 Collaboration and Cross-Program Initiatives

The hub is centred at CSIRO's Black Mountain Laboratories and the Australian National University, with other major collaborating institutions and agencies including La Trobe University (Wodonga), University of Adelaide, The South Australian Museum, James Cook University, and the Centre for Biological Information Technology (University of Queensland). ABRS is also affiliated with the hub.

Taxonomic data and results from the hub will feed into the Atlas of Living Australia (ALA), and add to the data served to GBIF through Australia's Virtual Herbarium, Online Zoological Collections of Australian Museums (OZCAM) and ABIF.

4.4 Infrastructure

The hub will use the latest and best practice methodologies and techniques; manage and distribute the knowledge using novel, effective web-based platforms; and train the next generation of Australia's taxonomists. This will include taxonomic frameworks to access data, alternative pathways to data, and on-line systems for biodiversity identification. These technologies will be used to provide integrated and transparent access to biodiversity resource and research data, analyses and results in formats and presentation for a wide range of end users.

The greatly enhanced national biodiversity knowledge base will more likely achieve environmental benefits and impact through close end-user community involvement in the research projects. Specialist knowledge brokers will work with the community to assist information discovery and to translate complex taxonomic information into practical applications.

4.5 Contact details

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5. Atlas of Living Australia (ALA)

5.1 Background

Australia has a long history of a series of projects that have addressed the management of biodiversity data, like the ERIN (Environmental Resources Information Network), AVH, OZCAM (Online Zoological Collections of Australian Museums), several plant pest data bases and different separate projects in various government departments. Recently, a government initiative to encourage collaborative science activities to consider long term infrastructure needs by sharing collaborative resources led to the formation of the NCRIS (National Collaborative Research Infrastructure Strategy). The AU$14m the government is committing through the NCRIS to systems biology infrastructure will increase the ability to study the phenotypes of plants and animals and how these relate to their genetic make-up.

A consortium of Australian museums, universities, herbaria, the CSIRO and ABRS initially submitted a proposal, the Atlas of Living Australia (ALA), to develop a network for managing all the botanical and zoological data (specimens, character data, images, etc.). It was finally decided to integrate the former proposal with two additional ones: the Australian Phenomics Network and the National Plant Genomics Facility (see Annexes 2 & 3). As they should work together, the ALA is not only about integrating collection data but also about integrating biological information as a whole.

An online Atlas of Living Australia is being established, with funding until 2011, to provide ready access to the data worth AU$1 billion held in biological collections across Australia. The ALA will be a unique informatics platform that underpins the Integrated Biological Systems capability. Additionally, it will be an authoritative, freely accessible, distributed and federated biodiversity data management system that links Australia's biological knowledge with its scientific reference collections and other custodians of biological information. Development of the ALA is being project managed by CSIRO.

5.2 Responsibilities

The ALA has the responsibility for managing few botanical and zoological data on a large number of species and a large amount of gene expression data on a few species, while finding ways on building infrastructure that is equally useful to all parties. Its initial focus will be on metadata management and looking at the use of standards from the taxonomic databases working group and developing ontologies for this communities for supporting the best possible descriptions it can manage with all the different data resources. The goal is to start developing more interesting discoveries tools to be used by different communities.

The responsibilities of the ABIF will be taken over by the ALA by indexing the Australian biodiversity data and accessing a gateway back to GBIF for those data. Several data from different sources will be included, e.g., georeferenced, observational and ecological data will be indexed, occurrences will be mapped against local government areas, water capturement areas, national parks, and different ecoregions. Web pages will be available showing all the taxa that are currently known, what the basis is for them occurring there, and their status (threatened, pest, invasive). The long term goal will be producing more targeted combinations of information for different communities, in particular biosecurity, integrating identification tools, literature, images, current data were available, barcoding, and GIS applications like niche modelling.

5.3 Collaboration and Cross-Program Initiatives

The ALA will approach data integration cautiously, providing an overview of the information and redirecting the user to different sources (with the exception of some groups e.g., pest species, charismatic plants and animals, were there is sufficiently interest in developing more authorative web sites). The ALA will support existing networks like the AVH, OZCAM, EoL, etc., and allow them to continue maintaining their existing identities.

The formal funding partners of the ALA are four state museums, two university departments (representing specific projects), CSIRO, CHAH, DAFF and DEWHA (represented by ABRS). Other organisations (CHAFC, CAMD, CHAEC, and AMRRN) also have representation on the ALA Board of Management and are making in-kind contributions of data and expertise. This consortium represents most of the major biological collections and taxonomic institutions in Australia.

5.4 Infrastructure

The infrastructure for integrating the data will be developed by the ALA, however, it will not help producing the data. Therefore, the digitisation of the data will be entirely through the expenditure of the museum community (the original proposal included budget for supporting the digitisation of their collections but this component was not funded). Part of the ALA will be used to develop sets of tools to make data digitisation easier and to develop central services that will help with data validation, taxonomic references, etc.

The taxonomic content for the ALA will be provided by ABRS and the Australian Plant Census (an initiative of CHAH). The standards for description of collections and observations, taxonomy and nomenclature, descriptive data, etc. will be followed in accordance to the taxonomic working group (TDWG). Additionally, the ALA will use the work of the Species Profile Model (SPM) as a standard to simplify integration of species information from multiple sources and to maximise its usefulness and reusability. That will provide the ALA with a higher level of characterisation of information resources, cytology, reproductive biology, conservation biology, etc. At the same time, were applicable, to tag all of the data resources with more fine ontologies. Having indexed all of this information, the goal is to build a general purpose search mechanism which will provide a yellow pages, Google-like search interface (a search interface into the wider pool of information).

The ALA hopes to use other IT infrastructure that is being developed to support secure access to some data resources within the same framework. For instance, making visible quarantine interceptions for a particular fruit fly species to those who have the authorisation to see them within the framework of other data and, therefore, allowing them to combine as much info as possible. The ALA is interested in learning more about the architecture that EDIT is using for managing the integration of tools. Perhaps EDIT and ALA could use a similar architecture.

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6. South African National Biodiversity Institute (SANBI)

6.1 Background

South Africa is diverse not only in terms of its people and culture, but also in terms of its biological resources and ecology. In fact, South Africa is the third most biologically diverse country in the world, after Indonesia and Brazil. South Africa's biodiversity provides an important basis for economic growth and development, in obvious ways such as providing a basis for its fishing industry, rangelands that support commercial and subsistence farming, horticultural and agricultural industry based on indigenous species, its tourism industry, aspects of its film industry, and commercial and non-commercial medicinal applications of indigenous resources.

Through recognition of the value of biodiversity to the country and its people, the South African National Biodiversity Institute (SANBI) was formed in 2004 with the promulgation of the National Environmental Management: Biodiversity Act, 2004 (No. 10 of 2004). With the commencement of this Act, the National Botanical Institute (NBI), as from 1 September 2004, became SANBI.

6.2 Responsibilities

SANBI's mandate is the following:

1. SANBI must monitor and report to the Minister of Environmental Affairs and Tourism on
    i. The status of the Republic's biological diversity
    ii. The conservation status of all listed threatened or protected species and listed ecosystems
    iii. The status of all listed invasive species
2. SANBI must monitor and report regularly to the Minister on the impacts of any genetically modified organisms (GMOs) that have been released into the environment
3. SANBI may act as an advisory and consultative body on matters relating to biodiversity to organs of state and other biodiversity stakeholders
4. SANBI must coordinate and promote the taxonomy of South Africa's biodiversity
5. SANBI must manage, control and maintain all national botanical gardens
6. SANBI may establish, manage, control and maintain
    i. herbaria; and
    ii. collections of dead animals that exist;
7. SANBI must establish facilities for horticultural display, environmental education, visitor amenities and research;
8. SANBI must establish, maintain, protect and preserve collections of plants in national botanical gardens and herbaria;
9. SANBI may establish, maintain, protect and preserve collections of animals and micro-organisms in appropriate enclosures;
10. SANBI must collect, generate , process, co-ordinate and disseminate information about biodiversity, and establish and maintain databases in this regard;
11. SANBI may allow, regulate or prohibit access by the public to national botanical gardens, herbaria and other places under the control of the Institute;
12. SANBI may undertake and promote research on indigenous biodiversity and the sustainable use of indigenous biological resources;
13. SANBI may coordinate and implement programmes for
    i. the rehabilitation of ecosystems, and
    ii. the prevention, control or eradication of listed invasive species
14. SANBI may coordinate programmes to involve civil society in
    i. the conservation and sustainable use of indigenous biological resources; and
    ii. the rehabilitation of ecosystems;
15. SANBI on the Minister's request, must assist him or her in the performance of duties and the exercise of powers assigned to the Minister in terms of this Act;
16. SANBI on the Minister's request, must advise him or her on any matter regulated in terms of this Act, including
    i. the implementation of this Act and any international agreements affecting biodiversity which are binding on the Republic;

ii. the identification of bioregions and the contents of any bioregional plans;
iii. other aspects of biodiversity planning;
iv. the management and conservation of biological diversity; and
v. the sustainable use of indigenous biological resources;

17. SANBI on the Minister's request, must advise him or her on the declaration and management of, and development in, national protected areas; and
18. SANBI must perform any other duties
    i. assigned to it in terms of the Act; or
    ii. as may be prescribed.

6.3 Collaboration and Cross-Program Initiatives

SANBI's researchers collaborate with a large number of South African and international Higher Education and Research institutions, as well as government agencies, environmental management agencies, NGO's and private sector initiatives. Some examples of partnerships and collaborations include:

- The Botanical Society of South Africa. Founded at the same time as Kirstenbosch in 1913, membership of the Botanical Society organization entitles one to free entry to SANBI Gardens, a seed allocation, discounts on the purchase of publications and a free copy of Veld & Flora, a quarterly colour publication devoted to South African plants.
- The Global Invasive Species Programme aims to promote global co-operation in invasive species prevention and management.
- SABONET (Southern African Botanical Diversity Network). Launched in 1996, this project ran under the auspices of SANBI, and was aimed at upgrading the level of botanical expertise in Southern Africa. Now concluded, the network still functions at the level of individual collaboration.
- SSC Species Survival Commission of the IUCN – The World Conservation Union. The Chair's Office of this body is based at Kirstenbosch.
- Southern Africa Biodiversity Support Programme(SABSP). The SABSP is a programme which is implemented in 10 countries in the SADC region and is funded by the Global Environmental Facility. The website contains a document repository and a discussion forum.

Projects and programmes that SANBI leads or participates in include:

- Biota
- CAPE
- Grasslands
- Greening of the nation
- Millennium Seedbank
- SABIF
- SAEON
- SKEP
- Working for Wetlands

The broadening of SANBI's mandate to include all biodiversity and resource management implies that SANBI needs to identify its role within the biodiversity sector and that new and stronger relationships need to be built between SANBI and existing biodiversity related institutions. In this vein SANBI has established relationships with the following biodiversity related institutions, projects and groups:

- African Botanic Gardens Network
- Agricultural Research Council
- Agriculture, Education, Health, Water Affairs and Forestry
- Arid Zone Ecology Forum
- Biodiversity and Wine Initiative
- Bokkeveld Stewardship Project
- Botanic Gardens Conservation Initiative
- Botanical and Zoological Taxonomic Networks in Eastern Africa

- Botanical Society of South Africa
- Bushmanland Conservation Initiative
- CITES Scientific committees
- Conservation International
- Consortium for the Barcode of Life
- DIVERSITAS
- Environmental consultants
- EWT
- GMO Executive Council
- Horticultural Industry
- International agencies
- International and regional agencies, biodiversity institutions
- IUCN SA – World Conservation Union
- Learners and educators
- Lepidopterists' Society of Africa
- Local communities (visitors, neighbours)
- Local government
- Media
- Namaqualand Restoration Initiative
- Namaqualand Wilderness Initiative
- National Research Foundation
- Natural History Museums and private collections
- NGOs
- Other botanical gardens e.g. gardens managed by local government
- Other national departments – Science and
- Technology, Arts and Culture,
- Plant Protection Research Institute
- Provincial departments of Environment and Tourism and Education
- Regional / International biodiversity institutions
- SABI
- Seed industry
- Service providers and suppliers
- Scientific organisations (e.g., SAAB, SAES, ZSSA)
- South African National Survey of Arachnida
- Southern African Bird Atlas Project
- Southern African Butterfly Conservation Assessment
- Southern African Reptile Conservation Assessment
- Tertiary Education Institutions
- Tourists and tourist operators, guides and authorities
- Traditional healers
- TRAFFIC
- Working for Water
- World Wild Fund for Nature

6.4 Infrastructure

SANBI operates from several divisions, as follows:

6.4.1 Biosystematics Research & Biodiversity Collections Division

The Biosystematics Research & Biodiversity Collections Division forms the basis of SANBI's research activities. It is this Division that investigates, classifies, names and documents southern Africa's biota. It is also within this Division that fundamental biodiversity information is generated and made available to other Divisions within SANBI, conservation authorities, decision and policy makers, the general public, and a host of other stakeholders. SANBI is also increasingly embracing biodiversity in its broadest sense and is seeking partnerships with natural history collections and museums.

6.4.1.1 Herbaria

Biosystematics research at SANBI focuses on morphological, molecular and anatomical observational studies, and is mostly carried out in SANBI's three herbaria. The National Herbarium, the second largest herbarium in the southern hemisphere and situated in Pretoria, houses more than 1.2 million preserved plant specimens that are curated and researched in the context of the Flora of southern Africa region (comprising the countries of South Africa, Namibia, Botswana, Lesotho and Swaziland). It also keeps a comprehensive collection of fossil material from the 200 million-year-old Molteno Formation.

SANBI's two other herbaria are situated in Cape Town and Durban respectively. The Compton Herbarium (housing about 750,000 preserved plant specimens) focuses mainly on the flora of the winter-rainfall region of southern Africa, while the KwaZulu-Natal Herbarium (housing about 120,000 preserved plant specimens) primarily focuses on the flora of the subtropical eastern region of South Africa, in particular the flora of the KwaZulu-Natal province. The South African Museum collection (the oldest in the country) forms part of the Compton Herbarium, and is managed as a separate entity.

6.4.1.2 Data Management

Information on the plant specimens housed in SANBI's three herbaria is captured in the National Herbarium, Pretoria, (PRE) Computerised Information System (PRECIS). This is the largest database of its kind in Africa, and is a valuable research tool and information resource. The Data Management Section manages an Information Service and clients may request information on the southern African flora from this resource. It also makes biodiversity information available by producing and making targeted electronic information products freely available to the public via the Web.

6.4.1.3 Ethnobotany

SANBI's Ethnobotany Programme is a national focal point for research on the traditional uses of southern Africa's plants for their conservation, sustainable use and development. Its main activities involve bioprospecting the medicinal plants of southern Africa to develop new medicines for treating neglected African diseases such as malaria, and natural product research on important medicinal plants. The Ethnobotany programme is situated in KwaZulu-Natal, but collaborates with a broad spectrum of partners.

6.4.1.4 Publications

SANBI's Research Publications Department prepares and publishes popular and scientific manuscripts in several in-house publications i.e. the Strelitzia or Biodiversity Series, as well as Bothalia and Flowering Plants of Africa. Local and foreign scientists publish their research on the southern African flora in these periodicals. The SANBI Bookshop operates from the National Herbarium Building in the Pretoria National Botanical Garden. It offers a wide variety of publications, scientific and popular, in botany and related fields.

6.4.1.5 Libraries

The SANBI has two main libraries, The Mary Gunn Library in Pretoria and the Harry Molteno Library at Kirstenbosch in Cape Town. They rank among the biggest botanical libraries in the southern hemisphere and are a valuable resource for information on southern African flora and biodiversity. There are ten small regional satellite libraries. The mission of SANBI libraries is to

meet the information needs of all SANBI staff and to address a public demand for comprehensive, easily accessed information on the biodiversity of southern Africa.

6.4.2 Gardens

SANBI incorporates and manages 9 National Botanic Gardens (NBG's) located throughout South Africa.

6.4.2.1 Free State NBG

This garden, on the outskirts of Bloemfontein, spans a valley between picturesque dolerite koppies (hills) with the natural vegetation comprising tall grassland and woodland, dominated by magnificent wild olive and karee trees. The garden covers 70 hectares, and is home to about 400 species of plants, mainly from the Free State, Northern Cape and Lesotho, including a fine collection of decorative and hardy trees indigenous to the area.

6.4.2.2 Hantam NBG

The Hantam National Botanical Garden was established in 2007 and is located just outside the town of Nieuwoudtville in the Northern Cape, South Africa. Nieuwoudtville is located 52 km north east of Vanrhynsdorp and about 350 km north north-east from Cape Town on the Bokkeveld Plateau and forms the north-western border of the Cape Floristic region. The Garden comprises a total area of 6 200 ha and lies about 730 m above sea level.

6.4.2.3 Harold Porter NBG

This beautiful, secluded garden is set between mountain and sea, in the heart of the Cape fynbos region and encompasses 10 hectares of cultivated fynbos garden and 190.5 hectares of pristine natural fynbos. It is only 100 kilometres from Cape Town. Situated in the centre of the coastal fynbos where the flora is at its richest, the garden encompasses mountain slopes with their wind-clipped heathlands, deep gorges with relict forests, flats and marshes with restios, sedges and bulbs, as well as dunes adjacent to the beach with their specialised salt-adapted plants. The garden is renowned for its waterfalls and amber pools.

6.4.2.4 Karoo Desert NBG

The Karoo Desert National Botanical Garden is totally unique in that it is the only truly succulent garden in the southern hemisphere and on the African continent. One of the floral highlights of the year is spring, when thousands of annuals and brightly coloured vygies come into flower. This colour spectacle lasts from mid-August to the end of September. Approximately 11 hectares of the estate are cultivated, whilst the remaining 144 are kept as a flora reserve which has several kilometres of nature trails.

6.4.2.5 Kirstenbosch NBG

Kirstenbosch National Botanical Garden is world-renowned for the beauty and diversity of the Cape flora it displays and for the magnificence of its setting against the eastern slopes of Table Mountain. Kirstenbosch grows only indigenous South African plants. The estate covers 528 hectares and supports a diverse fynbos flora and natural forest. The cultivated garden (36 hectares) displays collections of South African plants, particularly those from the winter rainfall region of the country.

6.4.2.6 KwaZulu-Natal NBG

The beautiful and tranquil KwaZulu-Natal National Botanical Garden specialises in the conservation of plants from the eastern region of South Africa and of rare and endangered species from elsewhere. Established in 1874, the Garden's Victorian past is evident in its magnificent specimens of northern hemisphere plants, such as the swamp cypress, tulip trees, camphor trees, plane trees, giant figs and magnolias. One of the finest features of the Garden is the avenue of London plane trees, which has been stunning visitors since 1908.

6.4.2.7 Lowveld NBG

Rugged, rocky, river scenery is the perfect, spectacular setting for Nelspruit's main tourist attraction, the Lowveld National Botanical Garden, situated in the heart and at the hub of

Mpumalanga. The 159 ha garden straddles the Crocodile and Nels Rivers. Viewed from the air, it is clear that the two Rivers dominate the scene and determine the character of this Garden. The Crocodile surges through a narrow, solid rock gorge that has been scoured out and pot-holed over millennia, while the Nels River tumbles down a waterfall from the west, to converge with the Crocodile in a serene pool on a bend in the river.

6.4.2.8 Pretoria NBG

This 76 ha urban oasis is a pristine getaway a mere stone's throw away from the madding crowd. The Pretoria National Botanical Garden, founded in 1946, is home to the Head Office of SANBI. This Garden successfully bridges the divide between scientific research and the recreational environment. A 50 m high quartzite outcrop divides the Garden in two sections. Its frosty south-facing section and the north-facing, warmer section present two different worlds to the visitor and botanist. Paved nature trails give access to the fascinating natural vegetation on the ridge. Fifty hectares of the total area are devoted to a developed garden, using almost exclusively South African plants.

6.4.2.9 Walter Sisulu NBG

Against the backdrop of the magnificent Witpoortjie waterfall, this Garden covers almost 300 hectares and consists of both landscaped and natural veld areas. The history of the Garden shows that it was founded in 1982, but has been a popular venue for outings since the 1800's. The natural vegetation of the area is known as the "Rocky Highveld Grassland" and consists of a mosaic of grassland and savanna, with dense bush in kloofs and along streams.

6.4.3 Environmental Education (EE)

The indigenous plant resources of South Africa are an important focus in the process of building a culture of environmental knowledge and awareness. SANBI therefore regards the development of an effective and vibrant environmental education and interpretation programme as a priority. The environmental educational programmes are offered in the Free State, Kirstenbosch, Lowveld, Pretoria and Walter Sisulu NBG's.

6.4.3.1 EE at Free State NBG

The Environmental Education Programme at the Free State NBG offers a wide range of activities and resources for educators and learners. The programmes for learners are activity-based and learner-centred, reflecting the critical and developmental outcomes in the National Curriculum Statements. The trained staff at the Education Centre will assist dedicated educators who wish to develop Learning Programmes in collaboration with the Free State Department of Education, to foster environmental literacy and promote Education for Sustainability.

6.4.3.2 EE at Kirstenbosch NBG

The Garden based School Programme offers lessons to learners from Grade R to Grade 12 in the magnificent Kirstenbosch National Botanical Garden . A team of trained and dedicated education officers facilitate these lessons which engage learners.

The Outreach Greening Programme works with schools and communities to establish indigenous water-wise gardens. The three-year programme aims to provide learners, educators and community members with the knowledge and practical skills required to plan, establish, maintain and extend their gardens. It also encourages environmental responsibility and economic empowerment. The educational value of the gardens is promoted through Teacher Professional Development Workshops.

Teacher Professional Development consists of workshops which are not only linked to the Outreach Greening Programme, but also the National Lotteries-funded "Biodiversity Education and Education for Sustainable Development" Programme. These workshops aim to build the capacity of educators to incorporate various aspects of environmental education into the school curriculum.

6.4.3.3 EE at Lowveld NBG
The garden has been offering guided tours for schools and a need for formal educational programmes was inevitable. The Environmental Education Centre opened in February 2006 and started offering programmes to learners and educators in the Lowveld. The current staff ensures that both garden-based and outreach-greening services are available to the Lowveld community.

6.4.3.4 EE at Pretoria NBG
The Garden-based schools programme offers a wide range of fun-filled Environmental Education activities. These activities encourage learners to discover their environment and in the process learn more about the biodiversity of South Africa. The practical, hands-on approach lends itself to the development of skills associated with careful observation, recording and analysis of data. The programmes are based on the National Curriculum Statement and integrate environment into all learning areas. The approach furthermore emphasises education for sustainability and encourages learners to take responsibility for the environment.

6.4.3.5 EE at Walter Sisulu NBG
Our courses involve learning through fun and practical hands-on activities. Learners learn to care about, appreciate and understand their environment. The subjects come alive as learners apply classroom knowledge to real life. Programmes at this garden include Teacher support, School and community greening, and guided tours.

6.5 SANBI's response to EDIT WP3.5 questionnaire

6.5.1 Decision making and functioning

1. *How are the decision making and functioning issues while being an individual institute?*
   a. *governance*
   SANBI is a Schedule 3A Public Entity in the Department of Environmental Affairs and Tourism of the South African Government, and has to comply with the Public Finance Management Act (Act No. 1 of 1999) as well as National Treasury Regulations of the Department of Finance. These regulatory documents as well as various government-commissioned Reports (King I and II) regulate SANBI's governance. In addition, SANBI is annually audited by the Auditor General of South Africa.

   b. *cooperation and/or division of task*
   SANBI has a Board of Trustees which is appointed by the Minister of DEAT. The Board is the Accounting Authority of the Institute. Management (a CEO and several senior managers) comprise the Executive Committee, which is charged with the day-to-day running of the Institute.

   c. *responsibilities*
   (Functions in italics are listed in the Act as discretionary and were allocated as mandatory functions by Minister effective 1 December 2004)

Section in NEMBA	Function
11 (d)	Coordinate and promote taxonomy
11 (h)	Establish, maintain, protect and preserve collections of plants *(links with the Gardens functions)*
11 (b)	Monitor and report on the impact of GMOs
11 (l)	*Undertake and promote research on indigenous biodiversity and its sustainable use*
11 (f)	*Establish, manage, control and maintain herbaria & collections of dead animals*

Section in NEMBA	Function
11 (i)	*Establish, maintain, protect and preserve collections of animals and micro-organisms*
50 (1)	THIS MINISTERIAL FUNCTION GIVES FURTHER GUIDANCE ON THE NATURE OF THE RESEARCH SANBI IS REQUIRED TO UNDERTAKE The Minister must promote research done by the Institute and other institutions on biodiversity conservation, including the sustainable use, protection and conservation of indigenous biological resources.
50 (2)	Research on biodiversity conservation may include- (a) the collection and analysis of information about- (i) the conservation status of the various components of biodiversity; (ii) negative and positive trends affecting the conservation status of various components; and (iii) threatening processes or activities likely to impact on biodiversity conservation; (b) the assessment of strategies and techniques for biodiversity conservation; (c) the determination of biodiversity conservation needs and priorities; and (d) the sustainable use, protection and conservation of indigenous biological resources.
11(a)	Monitor and report regularly to the Minister on- - status of the Republic's biodiversity; - conservation status of all listed threatened or protected species and listed ecosystems; and - status of all listed invasive species.
48 (3) (a)	*Assist the Minister and others to prepare a national biodiversity framework, bioregional plasn or biodiversity management plans.*
48 (3) (b)	*Make recommendations to organs of state or municipalities to align their plans with the national biodiversity framework and bioregional plans*
11 (n) (iii)	*Coordinate programmes to involve civil society in (i) conservation and sustainable use of indigenous biological resources;* *(ii) the rehabilitation of ecosystems.*
11(c)	*Advisory & consultative body on matters relating to biodiversity to organs of state and other biodiversity stakeholders*
11 (m) (,ii)	Coordinate and implement programmes for (i) rehabilitation of ecosystems and (ii) prevention, control and eradication of listed invasive species
11(j)	Collect, generate, process, coordinate and disseminate information about biodiversity and sustainable use of indigenous biological resources and maintain databases
11(e)	Manage, control and maintain all National Botanical Gardens
11 (g)	Facilities for horticultural display, Environmental Education, visitor amenities & research
60(2)	Logistical, administrative and financial support for the Scientific Authority (monitors and advises re CITES)
11 (k)	Regulate and provide services to the public though the gardens, herbaria and other places under SANBI control
11 (2)	When it gives advice on scientific matters may consult other institutions
12	Undertake all necessary steps (e.g. staff, finances) to perform its duties
11(p) i,ii,iii, iv,v	Advise Minister on (i) implementation of Acts and international agreements; (ii) identification of bioregions; (iii) other aspects of biodiversity planning; (iv) management and conservation of biological diversity; (v) sustainable use of indigenous biological diversity,
11(q)	Advise on declaration, management of and development in national protected areas

Section in NEMBA	Function
76(3)	Assist municipalities to perform their duties in preparing invasive species plans
11(o)	Assist Minister to perform duties

d. priority setting
This done through establishing a negotiated Corporate Strategic Plan, which details the Institute's activities over a rolling 3-year period.

e. fund raising
SANBI receives about 70% of its expendable income from a central Government grant-in-aid, which is supplemented with own income, and donor and project funding (30%).

2. *Which problems or impediments did you encounter while developing a central organisation and while establishing joint goals?*

Not applicable

6.5.2 Communication mechanism

1. *How is the communication mechanism internally and externally organised (e.g., through a single or several departments or people)?*

Both internal and external communication is driven through the office of the Director for Marketing. Efforts are made to ensure that communications are channelled through a single office, where quality control, if necessary, is done.

2. *Does your institution and/or organisation have a front desk office (if not, what do you have instead)?*
The SANBI website, which is currently being re-engineered, effectively acts as a front desk regarding the dissemination of biodiversity-related information. Other typical 'Front-desk' tasks are decentralised into various offices.

3. *How does the front desk office, website or department functions for:*
a. CBD issues, tenders, calls, and media contacts
CBD: matters channelled through the office of the Director: Research Support
Tenders: matters channelled through a Supply Chain Management Unit in the Finance Division
Calls: channelled through a Reception desk
Media: through the desk of the Director Marketing

b. cooperative efforts

Jointly done by senior staff.

c. internal and external transfer of information
Primarily through the SANBI website, electronic newsletters and through publications.

4. *How is the information disseminated (e.g., through research themes, expertise, etc.)*
Internal – Internal workshops on specific themes which run across the different divisions, Annual project presentations, electronic newsletters, Quarterly and annual reports.

External – Quarterly Reports to DEAT; Annual Review; publications – scientific and popular; electronic newsletters; website

6.5.3 Future collaboration

1. *We would like to know what your opinion is regarding cooperating with EDIT*
   SANBI would welcome collaboration with other like-minded institutions and organisations, where such collaboration will lead to mutual benefit.

2. *What possibilities do you see that the EDIT consortium can link up with your institution and/or organisation, and with other international programmes?*
   Joint initiatives in: training, capacity-building and awareness raising in taxonomy, multilateral cooperative research, database development, dissemination of information, tool development.

6.6 Contact details

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7. National Commission for the Knowledge and Use of Biodiversity (CONABIO)

7.1 Background

The National Commission for the Knowledge and Use of Biodiversity (CONABIO) is an Inter-Ministerial Commission dedicated to the knowledge, conservation and use of biodiversity in Mexico. CONABIO was created in 1992 as a result of the International Meeting on the Problems of the Knowledge and Conservation of Biodiversity (Mexico is one of the five mega diverse countries with the highest biological diversity).

During 2008 CONABIO will finalise a transition phase toward the formation of a decentralised institution which will act as the National Centre for Biodiversity (CENABIO; although the name is not for sure). The Centre will overtake all the responsibilities and activities of CONABIO. However, it will operate under a new organisation.

7.2 Responsibilities

CONABIO is mainly dedicated to develop, maintain and update the National System of Biodiversity Information (SNIB) (see section 7.5.1); share knowledge on biological diversity; follow up on international agreements related to biodiversity; and advise governmental institutions and other sectors. CONABIO also supports projects and studies focused on the knowledge and sustainable use of biodiversity, and undertakes special projects (e.g., by helping indigenous groups to preserve their natural resources and obtain income by developing new products). Through its website, publications and periodical bulletin it conveys accessible information about biodiversity, its importance to Mexican society, and its uses.

7.3 Collaboration and Cross-Program Initiatives

CONABIO collaborates with a large number of Mexican and international research institutions, governmental and non-governmental agencies and private sector in projects relevant to the CONABIO's vision and objectives. Collaborations are developed by establishing liaisons and join funding, and funding specifics projects, among others forms. CONABIO collaborates with the National Biological Information Infrastructure (NBII) in the planning and development of regional information networks, such as the North American Biodiversity Information Network and the Inter-American Biodiversity Information Network. CONABIO also participates in the Integrated Taxonomic Information System and the Biodiversity Information Table of the Canada/Mexico/U.S. Trilateral Committee. Furthermore, CONABIO acts as the scientific authority of CITES and as the Focal Point of the Clearing House Mechanism; Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA); Global Taxonomy Initiative (GTI); and other groups of the Convention on Biological Diversity (CBD).

7.4 Infrastructure

The infrastructure of CONABIO is divided into six divisions, four of them (Bioinformatics, Analysis and Priorities, Project Evaluation and Liaison and International Affairs Divisions) are discussed in more detail below.

7.4.1 Bioinformatics

The Bioinformatics division is composed of three departments: Biotic Inventories, Geomatics (remote sensing and geographic information systems), and Systems.

Data from different sources (biological inventories, remote sensing, cartography and many others) are analysed to answer a varied kind of questions (e.g., forest fire detection, ecosystem monitoring, cartography, inventory of mangroves, vegetation and land use, and tropical cloud forests). In the near future, the databases will be used to asses the impact on climate change on species distributions. Additionally, CONABIO is starting a programme together with the US and Canada to develop a system for automatic derivation of land use changes for certain classes. The system will be valid for North, Central and South America, and will provide 1 or 2 times per year class changes (currently, it is obtained every 5 years).

7.4.2 Analysis and Priorities

Among many different activities, the division of Analysis and Priorities is in charge of the authority files: databases containing all the taxonomic information of valid or accepted names of species belonging to a particular group. The authority files are used as reference for the quality control of the nomenclature data that enters the SNIB (see Section 7.5.1).

7.4.3 Project Evaluation

The division of Project Evaluation is in charge of evaluating, providing funding and support to all the projects that have been successfully funded by CONABIO. In 2007 there were nine calls for proposals, 327 projects were received, and 98 projects were funded. CONABIO has three ways of funding projects: through calls (general), invitations (specific), or opportunity (open submission). The topics of the projects are broad, for instance: marine and hydrological priority regions, introduction of transgenics, invasive species, species richness, human health, digitisation of collections, updating of databases, etc.

7.4.4 Liaison and International affairs

The Division of Liaison and International affairs represents CONABIO internationally and is the Mexican focal point of several international authorities like CBD, CITES, SBSTTA, NAFTA. It is currently involved on the implementation of CBD issues at the state level by studying the biodiversity of 15 Mexican states (of a total of 32); the goal is to have a study for every Mexican state. The end result will be a series of publications and the implementation of strategic plans. For this purpose, it has to deal with the Mexican congress, local governments, local state universities and stakeholders.

7.5 Achievements

Among the main achievements of CONABIO regarding the EDIT interests are the consolidation of the National Information System on Biodiversity (SNIB), the creation of the World Biodiversity Information Network (REMIB), the automated system of heat points detection, the priority regions program for the conservation of biodiversity, and the development of the Biótica Information System (Biótica©), and the publication of more than 220 titles and research papers.

7.5.1 The National Information System on Biodiversity (SNIB)

The National Information System on Biodiversity (SNIB) is formed by various elements and is in charge of compiling and synthesising information on biodiversity and biological resources of Mexico, in order to establish a national inventory of species and provide assistance in regard to biological diversity to the government and the social and private sectors. The elements that form the SNIB are all the databases provided by the projects supported by CONABIO (see section xx) throughout the country, with taxonomic, geographic, ecological data, geographic coverages on topography, hydrography, vegetation, climate and satellite pictures, information systems for reforesting, fires and bio security, as well as various types of regionalisations.

The consolidation of the SNIB has broad implications that benefit both scientific research and Mexico's capacity as a nation to confront the challenges of utilisation, monitoring and conservation of Mexico's biological wealth. In this sense, REMIB acts as the portal through which this information is made available to the various government entities, non-government organisations, the academic sector and the public in general.

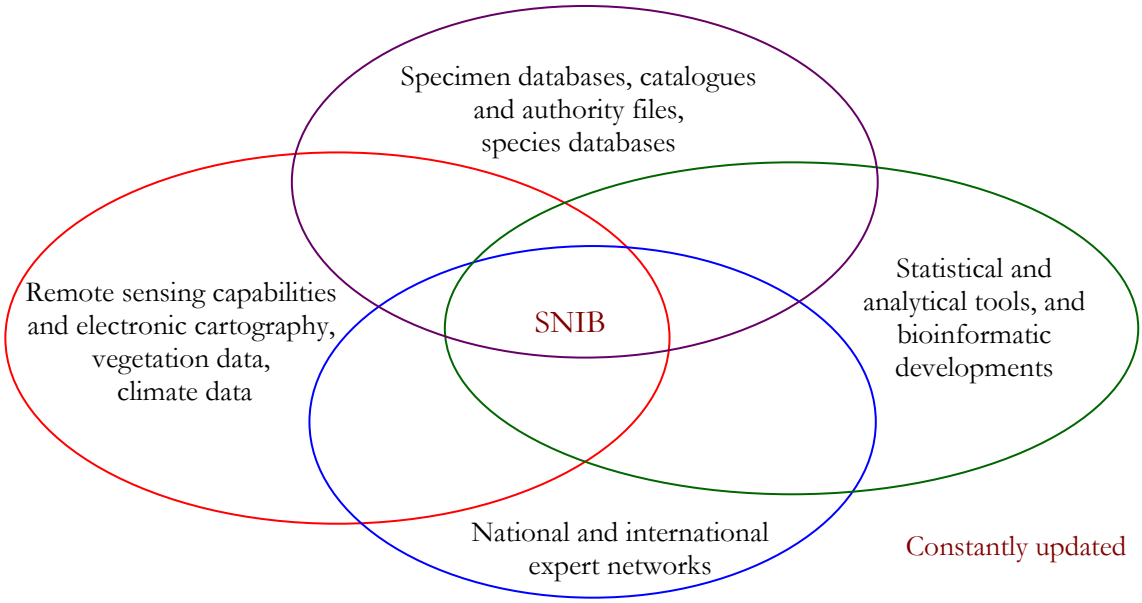

Figure 1. The National System of Biodiversity Information (SNIB)

7.5.2 The World Biodiversity Information Network (REMIB)

REMIB is a computerised system of biological information including databases of a curatorial, taxonomic, ecological, cartographic, bibliographic, ethno-biological type, use of catalogues on natural resources and other subject matters. REMIB is based on an academic inter-institutional decentralised and international organisation, formed by research and higher education centres, both public and private, that possess both scientific biological collections and data banks. Its main purposes are to promote the exchange of biotic information through an international network of databases, and to analyse and agree to joint policies on intellectual property, quality control and the forms for distributing the data; increase and improve accessibility and quality of this information, maintaining it up to date; and offer basic knowledge of biodiversity to the public in general, under the rules and procedures established herein.

REMIB functions with a total of 33 nodes (see Annex 4) in six countries: México, USA, Spain, Perú, Costa Rica, and the UK and the central node is CONABIO. Until now REMIB has a total of 6.6 million records available, however, only a small number of them can be consulted through the Global Biodiversity Information Facility (GBIF). For this purpose, a new version of REMIB has been developed. The new version will use the software 'Digir Data Provider' and allow obtaining search results in the standard 'Darwin Core'.

7.5.3 The Biotica Information System (Biótica©)

Due to the vast array of databases that already exist, and the diverse sets of data derived from projects supported by CONABIO, it was necessary to develop a unique biological data model to be used by the National Information System on Biodiversity (SNIB) and the individual user, The Biotica Information System (Biótica©). Biótica© is an information system especially designed to handle curatorial, nomenclatural, geographic and bibliographic data. It also allows for the handling of biological interactions (host-parasite, epiphyte-host) and accessory collections (laminas of pollen, xylotec, samples of tissue), the export of information geo-referenced to commercial SIG and the generation of special information in its own SIG, the site of the localities, validation of the information and a great variety of consultations. It also includes catalogues of lists of authorities, collections, institutions, states and municipalities, types of vegetation and growth forms.

Biótica incorporates the observations and suggestions of numerous institutions and specialists who have contributed their experience and know-how in obtaining a useful tool, adaptable to the needs and easily handled.

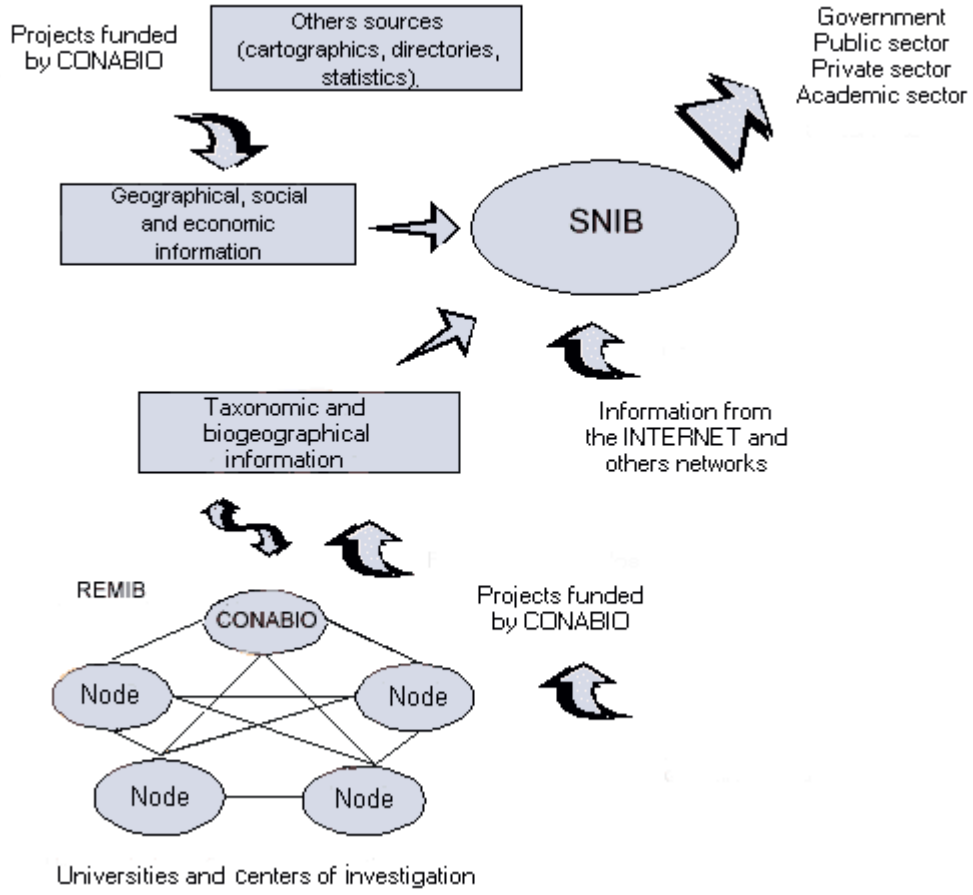

Figure 2. The databases that pertain to the SNIB and that form a part of REMIB are submitted to an internal validation process carried out at CONABIO

7.6 CONABIOS's response to EDIT WP3.5 questionnaire

7.6.1 Decision making and functioning

1. *How is the decision making and functioning issues while being an individual institute*

   a. *Governance*

   CONABIO was established in 1992 as an inter-ministerial commission, presided over by the Constitutional President of Mexico, and integrated by the heads of the State Ministries: Foreign Relations (SRE), Treasury and Public Credit (SHCP), Energy (Sener), Economy (SE), Agriculture, Livestock, Rural Development, Fisheries and Feeding (Sagarpa), Public Education (SEP), Health (SSA), Tourism (Sectur), Social Development (Sedesol), and Environment and Natural Resources (Semarnat). CONABIO is a bridge between universities, government and society.

   b. *Cooperation and/or division of tasks*

   CONABIO's operational group is headed by the National Coordinator, together with an Executive Secretary and six division directors:

   1. Bioinformatics
      i. Biotic Inventories
      ii. Geomatics

1. Geographic Information Systems
2. Remote Perception

iii. Systems

2. Mesoamerican Biological Corridor Project – México
3. Analysis and Priorities
   i. External Services
4. Project Evaluation
5. Liaison and International Affairs
6. Communication

c. Responsibilities

The Commission is mainly dedicated to develop, maintain and update the National System of Biodiversity Information (SNIB); support projects and studies focused on the knowledge and sustainable use of biodiversity, like the World Information Network on Biodiversity (REMIB); advise governmental institutions and other sectors; undertake special projects; share knowledge on biological diversity; follow up on international agreements related to biodiversity; and provide services to the public.

d. Priority setting

The directive group of CONABIO is in charge of the priority setting. CONABIO carries its duties in coordination with scientists, the private sector, non- governmental organisations and different governmental entities.

e. *Fund raising*

The financial resources that CONABIO makes use of in order to fulfil its duties are mainly provided by the Federal Government), and are administrated through a private trust fund, known as the Fund for Biodiversity. The Fund also receives national and foreign deductible donations, monetary or non-monetary contributions and allows private donors to contribute to the national effort of participating in the conservation of biodiversity.

2. Which problems or impediments did you encounter while developing a central organisation and while establishing joint goals?

- Reluctance of scientists to work around a completely open information system
- Reluctance of decision makers to use the information
- Budget restriction
- Availability of trained people
- Discontinuity on political decisions due to changes of government

7.6.2 Communication mechanism

1. *How is the communication mechanism internally and externally organised (e.g., through a single or several departments or people)?*
   - The Department of External Services (Analysis and Priorities Division)
   - The Division of Liaison and International Affairs
   - The new Division of Communication

2. *Does your institution and/or organisation have a front desk office (if not, what do you have instead)?*
   The Department of External Services (composed of 3 persons)

3. *How does the front desk office, website or department functions for:*
   a. CBD issues, tenders, calls, and media contacts
   The clearing house mechanism of Mexico is the whole CONABIO, being composed of the web page (available for the public to do queries, post questions, download maps, etc.), the different departments and areas, the documentation centre, the databases, and the SNIB.

   b. cooperative efforts
   The Division of Liaison and International affairs represents CONABIO internationally and is the Mexican focal point of several international authorities like CBD, CCA, CCAD, CITES, SBSTTA, NAFTA. Additionally, it coordinates the Bird Conservation Initiative, and is advisor to the Ministry of Environment.

   c. internal and external transfer of information
   The Department of External Services deals with an average of 1300 questions per year from the government, scientific community, teachers, students and general public. Most questions are received through the CONABIO website. The Department of External Services forwards the questions to a contact person inside CONABIO (there is a contact person for each division). Subsequently, all answers are forwarded with copy to this department.

4. *How is the information disseminated (e.g., through research themes, expertise, etc.)*
   CONABIO supports more than 1000 projects, reflected on the publications that are available online. Information is also disseminated through hardcopies and CD-ROMs.

7.6.3 Future collaboration

1. *We would like to know what your opinion is regarding cooperating with EDIT*
   EDIT is an initiative that is also very important outside Europe, especially for countries like Mexico which have a high biodiversity. CONABIO would like to:
   - Learn about the technology that EDIT is, or will be, using (e.g., scratchpads, tools, etc.)
   - Learn more about the engagement with stakeholders (especially with ecologists, general public, politicians, etc.)
   - Get involved in projects answering climate change questions by using its databases. For this activity, international expertise on climate model analyses will be required.

2. *What possibilities do you see that the EDIT consortium can link up with your institution and/or organisation, and with other international programmes?*
   - Training: CONABIO provides training courses related to biodiversity tools, data bases, remote sensing, etc.
   - International barcoding initiatives: CONABIO funds several Mexican barcoding projects.

7.7 Contact details

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8. References

ABIF: Australian Biodiversity Information Facility
http://www.abif.org/index.htm

ABRS: Australian Biological Resources Study
http://www.environment.gov.au/biodiversity/abrs/

AMRiN: Australian Microbial Resources Research Network
http://www.amrin.org/

ANBG: Australian National Botanic Gardens
http://www.anbg.gov.au/anbg/index.html

APC: Australian Plant Census
http://www.anbg.gov.au/chah/apc/

APNI: Australian Plant Name Index
http://www.anbg.gov.au/cgi-bin/apni

AVH: Australia's Virtual Herbarium
http://www.chah.gov.au/avh/

CANB: Austalian National Herbarium
http://www.anbg.gov.au/cpbr/herbarium/index.html

CERF: Commonwealth Environment Research Facilites
http://www.taxonomy.org.au/
http://www.taxonomy.org.au/poster.pdf

CHAEC: Council of Heads of Australian Entomological Collections
http://flyaqis.mov.vic.gov.au/chaec/index.html

CHAFC: Council of Heads of Australian Faunal collections
http://www.backingaustraliasfuture.gov.au/submissions/crossroads/pdf/118.pdf

CHAH: Council of Heads of Australian Herbaria
http://www.chah.gov.au/chah/index.html

CONABIO
http://www.conabio.gob.mx/

CONABIO year report:
http://www.conabio.gob.mx/institucion/conabio_espanol/doctos/InfConabio2005_2006.pdf

CPBR: Centre for Plant Biodiversity Research
http://www.cpbr.gov.au/cpbr/

CSIRO Plant Industry
http://www.csiro.au/org/PlantIndustryOverview.html

DEWHA: Australian Government Department of the Environment, Water, Heritage and the Arts
http://www.environment.gov.au/

ERIN: Environmental Resources Information Network
http://www.erin.gov.au

IBIS: Integrated Botanical Information System
http://www.anbg.gov.au/ibis/index.html

Integrated Biological Systems
http://www.ncris.dest.gov.au/capabilities/integrated_biological_systems.htm

IPNI: The International Plant Name Index
http://www.ipni.org/ipni/plantnamesearchpage.do

NCRIS: National Collaborative Research Infrastructure Strategy
http://www.ncris.dest.gov.au/

OZCAM: Online Zoological Collections of Australian Museums
http://www.ozcam.gov.au/about.php

REMIB: World Biodiversity Information Network
http://www.conabio.gob.mx/remib

SANBI: South African National Biodiversity Institute
http://www.sanbi.org/

9. Annex 1. Integrated Botanical Information System (IBIS)

The Integrated Botanical Information System is a single relational database that links the data held in the various collections of the Australian National Botanic Gardens, the Australian National Herbarium, the Australian Plant Image Index and the Australian Plant Name Index.

IBIS provides the infrastructure, applications and services supporting biodiversity informatics for the ANBG, CANB and their partnership with CSIRO Plant Industry, Centre for Plant Biodiversity Research. IBIS incorporates systems for the integration, retrieval and dissemination of biodiversity information; collections management; digital asset management; nomenclatural and taxonomic indices (APNI, APC); information delivery; web services (flora-online) and; federated database support (AVH, IPNI, GBIF).

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10. Annex 2. Australian Phenomics Network

The Australian Phenomics Network will provide a world-class network of mouse production, cryopreservation, phenotyping, documentation, distribution and data basing facilities that will remove current barriers, such as cost and accessibility, to making sophisticated mouse models of human and animal disease available for medical and other research groups in Australia. The Network will be led by Monash University and the Australian National University, in partnership with Victoria's Walter & Eliza Hall Institute for Medical Research, the Queensland Institute of Medical Research, the Menzies Research Institute and the Animal Resources Centre in Western Australia.

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11. Annex 3. National Plant Phenomics Facility

The National Plant Phenomics Facility will be established as a two-node facility with one node in South Australia, hosted by The University of Adelaide and the second node at the CSIRO Plant Industry and the Australian National University. The two nodes will provide state-of-the-art capabilities for plant phenotyping (offering controlled environments, field-based plant growth monitoring using high-throughput robotics, automated imaging and computing technologies) integrated with the ongoing adaptation and application of emerging phenomics measurement technologies. This will enable researchers to measure the attributes of plants (like Arabidobsis, cotton, rice wheat and barley) and relate these to their genetic make-up. The facilities will be unmatched anywhere else in the world. Consequently they are likely to attract researchers from other countries, encouraging collaboration with Australian talent.

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12. Annex 4. List of REMIB Research Centres

Advanced Studies and Research Center National Polytechnic Institute, (CINVESTAV, IPN)

Autonomous Metropolitan University-Unit at Iztapalapa, (UAM-I)

Autonomous University of Baja California, (UABC)

Autonomous University of Nuevo Leon, (UANL)

California Academy of Sciences, (CAS)

El Colegio de la Frontera Sur-Chetumal, (ECOSUR-CH)

El Colegio de la Frontera Sur-San Cristobal, (ECOSUR-SC)

Facultad de Estudios Superiores Iztacala, (FES-I-UNAM)

Herbarium of Geo. B. Hinton

Herbarium Kew of the Royal Botanic Gardens, (RBGKEW)

Institute of Biology, (IBUNAM)

Institute of Ecology, A.C.-Bajio, (IE-BAJIO)

Institute of Ecology, A.C-Xalapa, (IE-XAL)

Interdisciplinary Center of Marine Science, (CICIMAR-IPN)

Lichen Herbarium (ASU)

Marine and Limnological Science Institute, (ICMyL-DF-UNAM)

Marine and Limnological Science Institute-Mazatlan, (ICMyL-MAZ-UNAM)

Museum of Vertebrate Zoology, University of California-Berkeley, (UC-Berkeley)

National School of Biological Sciences, (ENCB-IPN)

National Vegetable Germplasm Bank, (BANGEV)

Northwest Biological Research Center, (CIBNOR)

The Missouri Botanical Garden, (MO)

The Molina National Agrarian University, (MOL)

The National Center of Reference of Biological Control Dirección General de Sanidad Vegetal, (SAGARPA)

The National Commission for the Knowledge and Use of Biodiversity, (CONABIO)

The National Institute of Biodiversity of Costa Rica, (INBIO)

The New York Botanical Garden, (NYBG)

The Royal Botanical Garden of Madrid, (MA)

The Zoological Museum of "Alfonso L. Herrera", Science Faculty, (MZFC-UNAM)

University of Arizona, (UA)

University of Sonora, (USON)

University of Texas at Austin, (UTA)

Yucatan Scientific Research Center, (CICY)