



COOPERATION ON BIODIVERSITY DATA MANAGEMENT FOR SPECIES AND ECOSYSTEM ASSESSMENTS

TERMS OF REFERENCE

Background

A series of challenges related to information and data management for assessment of biodiversity state (e.g. extinctions risks, ecosystem assessment, developing indicators of ecological integrity) have been identified during various exchange workshops between the Humboldt Institute (Colombia), the Comisión Nacional de Biodiversidad (CONABIO – Mexico), the South African Biodiversity Institute (SANBI) and the Centro Nacional de Conservação da Flora (CNCFlora – Brazil). This project aims to address some of these challenges through a series of workshops and through building a collaborative network of researchers in the following subjects:

- 1) Data interoperability and data processing times for the assessment of ecosystems and species
- 2) Standard software architecture for system collaborative development,
- 3) Criteria and tools for assessment and dissemination of information for endangered and exotic species; and
- 4) Methodological incorporation of species taxonomic and functional information into ecosystem integrity indices. This will increase the ability of countries to produce more robust and on time information for reporting Aichi targets and SDG goals.

Rationale

Colombia, Brazil, Mexico and South Africa have made important progress in the development of institutional frameworks to enhance the adoption of standards for compiling, making available and analysing biological information. However, there are technical and conceptual gaps that, once addressed, will improve these frameworks and allow the use of available information more efficiently for:

- 1) Assessing the risk of extinction and introduction of species;
- 2) Develop biological indicators for evaluating ecosystem integrity.

The Humboldt Institute, CNCFlora, CONABIO and SANBI have developed informatics infrastructures and implemented informatics applications to manage and analyse data related to species, climate and land cover. However one of the main problems with these developments is that they are isolated from one another, even in the same institution, and information that is produced in one platform is not automatically available in others. This lack of interoperability and automatization of data processing affects the efficiency of analysis, resulting in the delay of information delivery to attend policy needs. Added to this, the lack of agreed system architecture does not make possible a collaborative approach to system development which may promote cost reduction on this complex and expensive activity.

Ecological integrity is a concept that is highly subjective depending on the definition that each research institution has given to it. CONABIO and SANBI have advanced in the conceptualization of ecological integrity assessment, but although the conceptual frameworks are comprehensive of the structural, compositional and functional dimensions



of biodiversity, when using data for calculating an indicator to represent the status of ecosystems, land cover and climatic data are mainly used. Species taxonomic and functional information is rarely incorporated into this analysis. In addition, there is a need to advance in the methodological integration of species data, land cover and climate and to connect the different developments that are used to assess species extinction and introduction risk and ecosystem integrity, to facilitate comprehensive and rapid assessments for species and ecosystems at lower costs and processing times that allows us to have more robust indicators for ecosystem health.

Specifically for Colombia, this project will contribute to implementing the following planning instruments:

- 1) Colombia's National Policy for the Integrated Management of Biodiversity and Ecosystem Services.
 - Key topic 4: Biodiversity, knowledge management, technology and information.
 - Strategic lines: Knowledge management for decision making.
- 2) National strategies for species conservation (plants, birds, among others).
- 3) National strategy of exotic and invasive species.
- 4) Convention on International Trade in Endangered Species of Wild Fauna and Flora -CITES.
- 5) CONPES on Sustainable Development Goals, which objective is the improve data and monitoring systems to report indicator for SDGs, specifically the indicator on species extinction risk for reporting SDG 15.

Additionally, Colombia is implementing a Peace Agreement which is having an impact in high biodiversity areas. In this context, all the information gathered and data management, as well as the development of indicators are crucial for monitoring the impact of these future actions.

Objectives

The immediate Project objectives to which the small-scale funding contributes are as follows:

- 1) Develop tools and facilitate the adoption of standards for compiling and making available existing biological information through the respective national biodiversity information systems and platforms;
- 2) Improve biodiversity information management and storage and foster more efficient use of information; and
- 3) Increase the ability of countries to produce more robust and on time information for reporting Aichi targets and SDG goals.

Expected Outputs and Outcomes

- 1) Technical exchange and capacity strengthening on criteria and tools for assessment and dissemination of information useful for management process regarding endangered and exotic species.
- 2) Common use in all four countries of the methodology for ecosystem integrity assessment in megadiverse countries designed by the participating institutions.



- 3) Better interoperability and automatization of data processing and better information delivery to attend policy needs.
- 4) Improved collaborative approach to system development.

Main Activities to Deliver the Outcomes

The activities to be carried out under this Small Scale Funding Agreement will build on the previous work undertaken jointly by the Humboldt Institute (Colombia), the Comisión Nacional de Biodiversidad (CONABIO – Mexico), the South African Biodiversity Institute (SANBI) and the Centro Nacional de Conservação da Flora (CNCFlora – Brazil). The specific activities of the project are the following:

- 1) *Activity 1:* Following an online meeting of representatives of the four institutions mentioned above to agree on agenda and expected outcomes, organization and facilitation of three five-day workshops with a specific objective, as follows:
 - (i) Establish a network of code developers and to agree software architecture for species assessment tool;
 - (ii) Facilitate technical exchange and capacity strengthening on criteria and tools for assessment and dissemination of information useful for management process regarding endangered and exotic species; and
 - (iii) Develop a flexible methodology for ecosystem integrity assessment in megadiverse countries and advance in a pilot a case study.
- 2) *Activity 2:* Establish a collaborative network of researchers in the following subjects: data interoperability and data processing times for the assessment of ecosystems and species; standard software architecture for system collaborative development; criteria and tools for assessment and dissemination of information for endangered and exotic species; and methodological incorporation of species taxonomic and functional information into ecosystem integrity indices;
- 3) *Activity 3:* Develop a flexible methodology for ecosystem integrity assessment in megadiverse countries. The methodology will be tested in two countries. All algorithms used to implement the methodology in the test countries will be available through an open software development platform such as GitHub;
- 4) *Activity 4:* Organize an online meeting to finish pilot case study for the implementation of ecosystem integrity assessment;
- 1) *Activity 5:* Develop a project proposal for a follow-up cooperation project to be submitted for funding from other sources.

Schedule of Activities

- *April 2018:* Selection of participants and venue for each workshop (Activity 1);
- *April-May 2018:* The leader of each workshop at the Humboldt Institute will propose an agenda, core subjects and expected outcomes (Activity 1);
- *May 2018:* Online meeting to agree on agenda and expected outcomes (Activity 1);
- *July-August 2018:* One five day workshop to establish a network of code developers and to agree software architecture for species assessment tool (Activities 1 and 2);



- *July-August 2018*: One five day workshop to have technical exchange and capacity strengthening on criteria and tools for assessment and dissemination of information useful for management process regarding endangered and exotic species (Activities 1 and 3);
- *July-August 2018*: One five day workshop to develop a flexible methodology for ecosystem integrity assessment in megadiverse countries and advance in a pilot a case study (Activities 1 and 3);
- *September 2018*: Online meeting to finish pilot case study for the implementation of ecosystem integrity assessment (Activity 4);
- *September 2018*: Development and submission of a project proposal for the follow-up cooperation project (Activity 5).

Implementation

The Humboldt Institute will lead the technical development of the project and manage the execution of financial resources. The project coordinator will be Dr. María Cecilia Londoño, Senior Researcher of the Biodiversity Monitoring and Assessment program.

Dr. Londoño will be supported by Dr. Carolina Castellanos Castro and MSc María Piedad Baptiste, adjunct researchers of the Biodiversity Sciences program, in the following activities: workshop preparation and planning, communication with stakeholders in each institution, technical and financial follow-up and writing of final reports.

Technical and financial implementation of the project will also be oversaw by the Scientific Direction. In addition, financial execution is supported in each program by an administrative professional, who is responsible for the request and follow-up of expenses, and the production of periodic reports for the Institute's planning and financial office and funders.

Technical and Scientific Cooperation

Under the leadership of the Humboldt Institute, the activities of this Project are designed to fully involve three leading biodiversity-focused institutions from Brazil, Mexico, and South Africa. This Project builds on the work previously undertaken by scientists from these four institutions.

Reporting

- 1) *Tracking and reporting*: Mid-term progress and final output will be reported to BBI team. Participation to BBI meeting and presentation of output would be delivered upon request of BBI team.
- 2) *Measurable indicators*: The project will be monitored using the following indicators:
 - Number of parties and actors empowered in the workshops and virtual technical exchange;
 - Elaboration of a document with agreed upon software architecture for species assessment and a work plan describing tasks and responsibilities identified through a Project Management & Team Communication Software;
 - Elaboration of a document with the proof of concept of a flexible methodology for ecosystem integrity assessment in megadiverse countries; and
 - Draft of at least one proposal of collaboration between countries.