

SYNTHESYS

Synthesis of systematic resources

Project:	Synthesis of systematic resources
Project acronym:	SYNTHESYS3
Grant Agreement number:	312253
Deliverable number:	3.5
Deliverable title:	Sustainability Workshop
Deliverable author(s):	Stefanie Krause & Christiane Quaiser (Museum für Naturkunde Berlin)

Date:	January 2016
-------	--------------

Report on Deliverable 3.5 „Sustainability Workshop“

Framework and Background

Natural history collections are primarily regarded as work basis for taxonomic, systematic, and evolutionary studies. However, an important characteristic of objects housed in natural history collections is that they are usually stored and used beyond the scope of the original collecting event. They thereby may help to answer questions unrelated to the intentions of the original sampling. Material and knowledge provided by natural history collections are extensive and manifold and may contribute significantly to a vast array of disciplines. Their relevance for solving problems outside the traditional and conventional fields and within interdisciplinary projects becomes increasingly recognized. Examples for non-conventional uses are, for example, related to the fields of agriculture and plant protection, human health and epidemiology, environmental monitoring and estimation of anthropogenic impact, biodiversity distribution modelling, archaeology, biomimicry and bionics, arts and design, social sciences, and wildlife protection regulations.

Being open and supportive of new approaches is a characteristic of successful research and important for using the whole potential of natural history collections. Moreover, it is also essential to broaden their user base and visibility across a broad range of disciplines. Most institutions housing natural history collections not only have a public mission to comply with but also the constant task to account for their importance and relevance. Their significance for society as a whole has to be promoted and the visibility of their work and impact has to be increased. The identification and involvement of potential new user groups is one crucial step during this venture. Future trends and novel application possibilities need to be recognized in time and fostered by the collections' management. Suitable, sustainable mechanisms to enhance the diversity of collections' uses and user communities have to be developed.

However, innovative uses of collections' objects often involve requirements which cannot be met. In contrast, numerous aspects concerning the sampling and storage of these collections' objects (for example, coverage of associated data, method of preparation, and criteria of cataloging) often preclude several kinds of later uses. Therefore, increasing and diversifying the user base of natural history collections also means to detect their current limitations and to prepare for the upcoming demands and needs of innovative, non-conventional uses.

The workshop **“Natural History Collections – Meeting the Future Needs of Users”** was an initiative of SYNTHESYS3, an EU funded project which aims for an accessible, integrated EU resource and, importantly, to broaden the user group (www.synthesys.info/). The workshop was based on previous and current initiatives like the report of the IWGSC (Interagency Working Group on Scientific Collections, <https://usfsc.nal.usda.gov/>), the EDIT – SYNTHESYS Workshop in Brussels (04th to 05th November 2008) (http://application.synthesys.info/downloads/NA_C/Workshop_Collections_EDIT_SYNTHESYS_Feb_09.pdf), and the activities of SciColl (Scientific Collections International, <http://scicoll.org/>). The output of the workshop will also be the base of a European Roadmap (Deliverable 3.6), which will be committed to CETAF (Consortium of European Taxonomic Facilities, <http://cetaf.org/>) for promotion and sustainable implementation.

Aims of Workshop

One basic aim of the workshop was the compilation of traditional and current uses of natural history collections as well as the identification of non-conventional and, moreover, potential uses and user groups. Experiences with innovative approaches and projects, which benefit from natural history collections or even heavily rely on these, were to be presented, discussed, and analyzed. Results of previous work on this topic were to be included in the discussion, complemented, and concretized. The progress since former initiatives was to be assessed.

Besides evaluating the potential and opportunities of natural history collections in terms of usability, also their limitations were to be outlined. Potential challenges and barriers to use natural history collections in non-conventional ways were to be discussed and likely demands and needs of new user groups to be elaborated. The possibilities of collections managements to appropriately respond to these needs were to be evaluated. Approaches to avoid or remove possible barriers were to be proposed. The feasibility and also the benefits to open collections to new user groups and to accommodate their requirements were to be examined. Recommendations regarding the institutions' weighing of respective interests (cost-benefit analyzes) and their prioritization were to be drafted.

Furthermore, one main aim of the workshop was to define means to promote innovative uses and to reach potential new user groups. Possibilities to communicate the diverse, broad application fields of natural history collections and to promote their importance for society as a whole were to be outlined.

Organizational Details

The Workshop "Natural History Collections – Meeting the Future Needs of Users" was hosted by the Museum für Naturkunde Berlin (MfN) and held on the 21st (noon) to 22nd (evening) October 2015 at the premises of the Leibniz Association, Berlin. Several SYNTHESYS3, EUCOLL, and other partners were involved to discuss the workshop details in advance. A workshop concept was submitted to the NHMMT and its feedback was incorporated.

Beside specific invitations of keynote speakers, moderators and (other) external experts, general workshop invitations were sent to the management level of the SYNTHESYS3 partner institutions. Additionally, the public lectures were widely announced within the relevant communities. Eventually, 16 delegates and external experts participated in the non-public part of the workshop. About 30 persons attended the public lectures.

A welcome and introduction to the workshop and its public lectures were given by Dr. Christoph Häuser (MfN, EUCOLL) and Dr. Christiane Quaiser (MfN, SYNTHESYS3).

The **first workshop day** provided an introduction and inspirations through public keynote presentations given by invited speakers with different professional background (in that order):

- Dr. Vincent Smith (Natural History Museum, London): *"Building on the successes of SYNTHESYS: creating sustainable access and business models for natural history collections"*
- Dr. Sandra Knapp (Natural History Museum, London): *"Collections for understanding environmental change"*
- Prof. Dr. Günter Rolf Fuhr (Fraunhofer-Institut für Biomedizinische Technik IBMT, Sulzbach): *"Low-temperature biobanking – possibilities, potentials and limitations of cryopreservation"*
- PD Dr. Jens Amendt (Universitätsklinikum Frankfurt der Goethe-Universität, Institut für Rechtsmedizin, Frankfurt am Main): *"Interactive natural history collections as a possible tool in forensic and medical entomology"*

- Prof. Dr. Herbert D.G. Maschner (Center for Virtualization and Applied Spatial Technologies, University of South Florida, Tampa): *“Open access natural history and the democratization of science”*

The abstracts of the keynote presentations were published in the accompanying workshop brochure, which was also (digitally) distributed within the Task participants after the workshop.

The **second workshop day** was dedicated to discussions in two working groups (breakout groups), during which the participants exchanged experiences, opinions and ideas on different topics. Greater subjects and questions to discuss were:

- Traditional and current uses of natural history collections / non-conventional and potential uses of natural history collections
- Orientation and adjustment of collections management to future needs / limitations and benefits (weighing respective interests and costs)
- Reaching new user groups: improving interdisciplinary visibility of natural history collections / promotion of innovative uses and potential of natural history collections to public

These key questions and issues were summed up and structured as follows:

- I. Current and future uses and user groups
 - a. Overview of current uses and user groups (quick check)
 - b. Future uses and user groups as well as aims and purposes
 - c. Needs (e.g., infrastructure, access, data, services)
- II. Implications
 - a. Benefits (for natural history collections community)
 - b. Unmet needs, barriers, challenges, limitations
 - c. Strategies to overcome these: joint actions
 - d. Cost-benefit analysis
- III. Outreach mechanisms (joint actions)
 - a. Priority list of new user groups
 - b. Strategy to approach them
 - c. Future actions: promotion

The teamwork sessions of the second workshop day were moderated by Dr. Wouter Los (University of Amsterdam) and Dr. Christiane Quaisser. The results of both working groups were presented, discussed and summarized in a concluding session with all workshop participants. The results of these discussions were summarized and subsequently distributed within the Task participants.

Summary of Output

➤ Virtual or Digital Collections

During the Sustainability Workshop, it was emphasized that **virtual or digital collections** increasingly are becoming an important service. (Online) users of digital collections count as museum visitors and thus are increasing the user bases and audience of the respective institution. However, digital collections cannot capture all information needed by researchers. In contrast, physical collections will remain to be the main source of (full) information. Digital collections should be regarded and treated as part of the whole collection.

➤ User Communities

Also, it was agreed, that – generally – natural history collections have always been research driven and that the **research community** will remain to be the **core user community**. However, natural history institutions evolved

from inward focused to outward oriented organizations, with effect on the (actually and potentially) required portfolio of tasks and services. Among others, challenges and novel implications for natural history institutions result from changing economic situations and circumstances. Cost-benefit-analyses and new financial and intellectual business models, for example, are introduced and realized. Therefore, collaboration and joint efforts of natural history institutions become more and more important, if not essential. Also, two aspects become more relevant: For one thing, current business should be done more efficiently. And for another thing, natural history collections should be opened up for new users and uses.

There already is a huge range of user groups of natural history collections, but they are mainly driven by individual projects and therefore rather fragmented. **Examples for current and new user communities** come, among others, from the fields of

- Environment, e.g. concerning
 - Urban planning
 - Environmental impact assessment
 - Deep sea mining
 - Conservation planning and monitoring
- Agriculture, e.g. concerning
 - Identification
 - Future domestication
 - Land use change
 - Industrial insect farming
 - Forestry
- Health, e.g. concerning
 - Pathogen identification
 - Medicine and food supplement verification
 - Pharmaceutical industry
- EU border control, e.g. concerning
 - Invasive species and pests
 - CITES
- Biobanking, e.g. for
 - Research
 - Government
 - Industry (medicine, biotechnology)
- Forensic ecology
- Arts
- Cultural history and archeology

New user groups would add to the relevance of collections and add new (virtual) information. A shift in thinking towards a **benefit-based approach** is necessary. Key questions should focus on who could use and benefit from the collections and on how the access and use by new user groups could be facilitated. Institutions housing natural history collections are challenged to work in both directions at the same time: On the one hand, it should be shown what can be offered. On the other hand, the (new) users should be asked about their needs and the requirements which would allow them to use the collections.

➤ **New and Revised Approaches**

The following steps towards **benefit-based approaches** are suggested:

- Development of a matrix of identified communities: For each community, identification of major drivers (e.g., societal challenges), benefits of using natural history collections, and common benefits of collaboration

- Identification of groups which would greatly benefit from coordinated activities of European institutions housing natural history collections
- Since the establishment of collaborations needs time and effort: (Also) investment in groups or fields the respective natural history institution already cooperates with and becoming more efficient

Approaches of natural history institutions with collections should be customer driven, not the other way around. As main **guiding principle towards a “customer first approach”** it is suggested to consider a re-orientation of the respective institution towards putting customers as the first priority and to analyze trends of customers’ interests and means for their satisfaction. Resulting implications for changes in internal priorities and staffing should be considered and realized. The diverse activities of the different institutions with natural history collections should be evaluated and, based on that, a **European task division** should be established.

Regarding **science and research**, the following **guiding principles** for natural history collections are proposed: Rather than offering new services and technologies, **grand challenges** should be addressed and contributed to. That is, the focus should lie on purpose-driven projects. Big problems or issues as basis for joint actions and subsequently (new) services should be agreed on and coordinated at European scale. Leadership with collective action should be shown. Also, for example, interacting systems (like biodiversity and other systems) should have an effect on and be reflected by the integrative structure amongst and within collection institutes and counterparts.

Some actions recommended during the workshop are rather aspects of a **technology push**; some others are rather related to a **market pull**. Both kinds should interact and influence each other in both ways.

A **technology push** may be fostered by

- Brainstorming about new uses, with contributions from diverse disciplines and infrastructures
- Joint publications on uses and new options for specific areas (e.g., taxonomic groups, expertise units) with presentation of success stories
- Establishment of a European scientific advisory group
- (Reinforced) welcoming of guest researchers from other disciplines

A **market pull** may be recognized and supported by

- Interviews and discussions with (potential) users
- Identification and realization of new ways to address people from outside the traditional world of natural history institutions, e.g. through hackathons to challenge new uses of virtual information
- Upscale of coordinated services, like
 - Digitization and other services on demand
 - (Financial) incentives to attract new users and their ideas
 - SYNTHESYS access calls for new communities, related to grand challenges and new uses

Competencies and services which potentially may be offered by natural history collections are, for example:

- Provision of expertise, e.g. through
 - Identification services for border control, agriculture, forestry, and others
 - Advice on collection management, training, and knowledge transfer
- Mapping and Monitoring
- Provision of data and voucher repositories; storage and management (hosting) of external user collections
- Services on demand, e.g.
 - Digitization
 - Sampling
 - Analyses

- Management

For services on demand, a priori cost calculations need to be conducted.

Easy and comprehensive overview of and access to tools and services offered by the respective natural history institution should be provided (digitally as e-facility), for example via a directory of services, service portal(s) customized to user needs, or portal(s) to collections. These portals may (among others) provide access to information, object data, images, identification tools, and expertise.

➤ Action points

The workshop outcomes are relevant for (among others) SYNTHESYS, EUCOLL and CETAF. During the workshop, it was agreed that one main action point for the near future should be the drafting and issuing of a **joint journal publication**. It should or may be used as public relations brochure for lobby activities. As title, “Natural Science Collections and the Grand Challenges” is recommended. Success stories should be included and attention to the global scale should be paid. No separate, parallel activities in a different track to SciColl should be taken. Previous and parallel activities (for example, the EDIT – SYNTHESYS workshop 2008 and SciColl activities) should be evaluated in order to avoid duplications but to take their results into account. Before the publication draft will be wider distributed and discussed, it should be made sure that it is supported by sufficient leadership.

Further action points suggested during the workshop are:

- (Potential new) user groups should be identified and compiled in priority lists.
- Priority user groups should be contacted. A common language and understanding of needs and benefits should be achieved.
- New users or user groups should be invited to learn about the potential of natural history collections. Possible means are, for example, open days, SYNTHESYS access calls for new user groups, and virtual access for non-European users.
- Collection-based services should be designed and developed. Business cases are, for example, identification services, digitization on demand, 3D print on demand, sequencing and analyses on demand, collection management services, and hosting of collections. A collections directory should be developed. For this purpose, GRSCiColl (The Global Registry of Scientific Collections, <http://grscicoll.org/>) should be checked and a European branch or subdivision be developed.
- For natural history institutions, a change of basic attitude towards a customer-oriented work culture should be supported. Activities like collaborations and outreach activities should be monitored.

Outlook

One main recommendation resulting from the Sustainability Workshop was to address the discussed issues in a widely distributed joint publication. As agreed with Jiří Kvaček (NMP, lead of Objective 3) during a limited Task 3.1 teleconference on 23rd November 2015, a proposal with details on such a publication as well as a corresponding schedule was drafted at the MfN and revised at the NMP. The revised proposal will be submitted to the NHMMT and subsequently discussed with all Task participants. The publication will be understood as output of Subtask 3.1.2 (*Openness to changing use of NH institutes is going to future proof the unpredictability of future needs. Policy statement. Promoting the widening access to collections to users*) (lead by MfN) and, together with the other results of the workshop, will contribute to the realization of Deliverable 3.6 (*European Roadmap*) (lead by NMP).