

Swiss Natural History Collections Network

Implementation Plan 2021-2024

Table of contents

1	Summary	3
2	Introduction	3
3	Aim and objectives	3
4	Governance	4
	4.1 The Steering Board (SB)	4
	4.2 The Board of Experts (BoE).....	5
	4.3 The Scientific Unit (SCNAT).....	5
5	Institutions and organisations involved	5
6	Project plan	5
	6.1 State of the art.....	5
	6.1.1 Governance.....	6
	6.1.2 National strategy for Natural History Collections 2025-2035.....	6
	6.1.3 Survey on natural history collections	6
	6.1.4 Standards for object and data storage, interoperability and organisation	6
	6.2 Milestones SwissCollNet 2021-2024	6
	6.2.1 Governance.....	6
	6.2.2 National Strategy for Natural History Collections (2025-2035).....	7
	6.2.3 Survey on natural history collections	7
	6.2.4 SVNHC	7
	6.2.5 Modernisation and digitisation of the Swiss natural history collections.....	7
	6.2.6 Network development.....	8
	6.2.7 Long-term sustainability of the Swiss Virtual Natural History Collection.....	9
	6.3 Type of projects and funding schemes	10
7	Implementation calendar	10
8	Budget	12
	8.1 Federal contributions.....	12
	8.2 Matching funds.....	12
9	Conclusions	13
10	References	13
11	Appendices	14
	Appendix I - Members of the governing bodies	14
	Appendix II - Institutions and organisations involved.....	15
	Appendix III - Mandate of SwissCollNet	16
	Appendix IV - Maximum salaries eligible as matching funds	19

1 Summary

The SwissCollNet initiative aims at making data on specimens from the Swiss natural history collections available for research, education and society. SwissCollNet will mobilise and provide open-access to specimen data through nationwide data harmonisation and interoperability among all relevant stakeholders and data providers, such as natural history museums, botanical gardens and institutions of higher education. The foremost and overall goal of this four-year period is to identify, prioritise and digitise as many collections as possible and to build an online portal, the Swiss Virtual Natural History Collection (hereafter SVNHC), which will provide open-access to harmonised specimen data from the Swiss collections.

On the basis of the federal decree on credits for research funding institutions for the years 2021-2024 (article 2 paragraph 1 letter d), SCNAT is tasked with conducting this initiative with a financial support of MCHF 12.37. The available funds will be invested to modernise and digitise the collections, to ensure data interoperability, to develop the SVNHC, to coordinate with the relevant international initiatives and to ensure the sustainable operation of the SVNHC.

All Swiss public and non-profit natural history collection-holding institutions are invited to participate by submitting project proposals and thus sustain the initiative with their professional experience and expert knowledge.

2 Introduction

With more than 60 million specimens of animals, plants, fungi, rocks, soil samples and fossils, Switzerland's museums, universities, and botanical gardens store remarkably extensive collections: taken together, the Swiss collections form an entity whose scientific value is comparable to that of the most prestigious foreign institutions. These objects document the diversity on and below the surface of our planet, in Switzerland and abroad, represent a record of changes over millions of years. Museum collections and herbaria are becoming increasingly important for basic and applied research. For example, they contain essential information for research on pressing social issues such as health (disease-carrying organisms), agriculture and forestry (beneficial insects, pests, pesticides), climate, biodiversity (insect mortality) or subsurface use. However, only 17 percent of this international scientific and patrimonial treasure is digitised. This means that a large part of unique data on biodiversity and the environment is not easily accessible for research and education.

To make use of the scientific and societal potential of the extraordinary amount of specimens in Swiss natural history collections, the Swiss Academy of Sciences (hereafter SCNAT) together with the musnatcoll (Verband der naturwissenschaftlichen Museen und Sammlungen der Schweiz und Liechtenstein), the Swiss Systematics Society, GBIF.ch (Global Biodiversity Information Facility, Switzerland) and Info Species proposed a research infrastructure initiative to increase the access to natural history collections in Switzerland for research, innovation and education.

Together with representatives of collection-holding institutions, they identified their common challenges and defined goals and measures to increase the digital and physical accessibility of natural history specimens distributed in the numerous collections in Switzerland (Swiss Academies of Arts and Sciences, 2019).

3 Aim and objectives

The long-term goals of the natural history collection-holding institutions of Switzerland are to reach sustainability for their conservation, curation and future development, to promote the physical and digital accessibility of their collections for fundamental and applied research, education and society, to build a strong network connected to the international initiatives, and to exchange and

develop their knowledge. These goals are being consolidated in a 10-year strategy that fosters the importance and use of the natural history collections in the Swiss institutions.

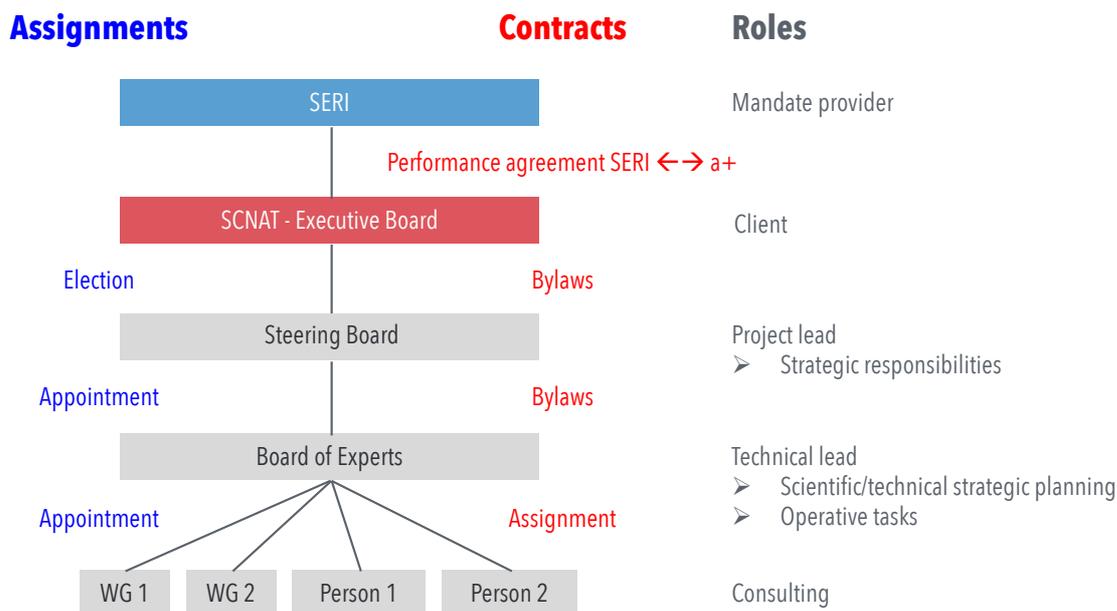
Within this context, the main objectives of the four-year period of SwissCollNet are to modernise and digitise the collections and provide an open-access to harmonised specimen data through an online portal, the SVNHC. To this end, the available funds will be invested to develop the SVNHC as well as to condition, integrate, modernise and digitize collections in Switzerland. Furthermore, a strategy will be developed to guarantee the sustainable operation of the SVNHC, an access to an increasing volume of specimen data and its international alignment.

4 Governance

SwissCollNet is a nationwide initiative that is implemented under the umbrella of the SCNAT.

The Executive Board of SCNAT is responsible for the election of a Steering Board and for mandating it with the overall strategic responsibilities of the initiative. A Board of Experts will support the Steering Board with its technical and operational expertise. For consultancy, single persons or groups of persons with the relevant specialist qualifications (working groups) can be convened by the Board of Experts for support in dealing with specific issues in its work at any time.

Figure 1: governance system of SwissCollNet. In blue, assignment relationships between the bodies; in red, contracts between the bodies; in grey, the roles of each body.



4.1 The Steering Board (SB)

Apart from the overall strategic steering of the project, the SB has several responsibilities: to allocate funds to the projects that serve the goals of SwissCollNet, to connect with the international initiatives, to engage in a dialogue with the political and administrative bodies at the national and cantonal levels, as well as to ensure the sustainability of the process by identifying a suitable organisation/institution, or consortium of organisations / institutions, to develop and run the Swiss Virtual Natural History Collection (for members see Appendix I).

4.2 The Board of Experts (BoE)

The technical and scientific expertise of the BoE covers the fields of collection management, databasing and digitisation of specimens, as well as training and connections with the international organisations, projects or initiatives in the field (for members see Appendix I).

4.3 The Scientific Unit (SCNAT)

The Scientific Unit acts as the management office and is run by the SCNAT. It is responsible for the daily operations and assists the SwissCollNet bodies in the performance of their tasks (for members see Appendix I).

5 Institutions and organisations involved

musnatcoll is a main player in and partner of SwissCollNet. The association represents the interests of the natural science museums, botanical gardens and natural history collections of Switzerland and Liechtenstein. Its aim is to make visible and communicate on the importance of natural science collections and museums as part of the national and international cultural heritage. Public and non-profit institutions with natural history collections will play an essential role in SwissCollNet. Besides the precious scientific and cultural heritage - the collections - these institutions hold excellent knowledge in taxonomy as well as in the curation and management of collections for scientific and societal use (for collection-holding institutions that support SwissCollNet see Appendix II).

The **Swiss Systematics Society** unites biologists from different fields, dedicated to the interests of systematics and taxonomy and maintains international exchange of knowledge. As a partner of SwissCollNet, it offers a large pool of experts in systematics and taxonomy and serves as a competent contact for scientists and the society.

GBIF.ch is the Swiss Participant Node recognized by GBIF international (Global Biodiversity Information Facility). The Swiss Node is officially elected by the Confederation to create optimal conditions for the incorporation of biodiversity information available in Switzerland within the GBIF world biodiversity data aggregation network. Its ultimate aim is to register all specimens of botanical, paleontological, mineral and zoological collections of Museums, conservatories and botanical gardens in Switzerland, along with observational data compiled in all faunistic, floristic and mycological databases. The coordination and collaboration between SwissCollNet and GBIF.ch is thus imperative in order to develop the SVNHC and to mobilize the data related to specimens hosted in natural history collections in Switzerland both within Switzerland and internationally.

Info Species is the umbrella organisation of the national data and information centres, and the species promotion coordination offices in Switzerland. The organisation participates in the exchange of biodiversity data via GBIF.ch and promotes exchange and cooperation with neighbouring countries. The organisation supports the Confederation, cantons and other actors in implementing the species promotion measures formulated in the Action Plan for the Swiss Biodiversity Strategy, as well as in accessing and interpreting species evidence at various geographic or political levels. Coordination and collaboration with SwissCollNet are essential to maintain interoperability of specimen and observation data.

6 Project plan

6.1 State of the art

From 2018 to 2020, several investigations have been made to prepare the initiative SwissCollNet.

6.1.1 Governance

A group of experts representing the organisations described earlier together with experts from public collection-holding institutions was mandated by the SCNAT to prepare the construction/integration phase of SwissCollNet (2021-2024).

In December 2020, the Executive Board of SCNAT has adopted a mandate defining the collaboration rules with SwissCollNet governance bodies and has elected the first members of its Steering Board (see Appendix III).

6.1.2 National strategy for Natural History Collections 2025-2035

In 2020, musnatcoll circulated a questionnaire to its members, to which 26 collection-holding institutions responded. This first consultation allowed to identify some key elements that would be needed in a national strategy to create a country-wide approach to natural history collections, especially their management, enhancement, scientific use, and financial upkeep. It laid the foundations of a platform of coordination, communication and collaboration that will ensure the sustainability of SwissCollNet in the long-term. This bottom-up approach will continue to develop and finalise a 2025-2035 strategy (see 5.2.2).

6.1.3 Survey on natural history collections

In 2018, a survey on the natural history collections in Switzerland was conducted in collaboration with GBIF.ch. A total of 56 public and non-profit institutions provided global information about their collections, such as the number of objects - in total and per discipline (zoology, botany and mycology, palaeontology, geology and mineralogy), the percentage of objects of Swiss or international origin, the number of species with types, as well as the degree of digitisation of the objects.

These results were published in a SCNAT report in 2019 (Swiss Academies of Arts and Sciences, 2019), representing a first needed overview of the natural history collections hosted in the Swiss public institutions. This first survey will be refined to improve the collective understanding of the hosted collections and provide international visibility to their richness (see 5.2.3).

6.1.4 Standards for object and data storage, interoperability and organisation

The "Handbook on natural history collections management - a collaborative Swiss perspective" (Frick and Greeff, 2021) was published in early 2021 and is SwissCollNet's first contribution to support the exchange of knowledge among Swiss collections on object and data management. Written by experts and collection managers from the Swiss natural history institutions, it contains an overview of the current management practices and recommendations to maintain and modernise the collections of preserved biological materials and geological samples.

6.2 Milestones SwissCollNet 2021-2024

The following milestones and actions are planned for SwissCollNet between 2021 and 2024. They all contribute to reach sustainability for the conservation, curation and future development of natural history collections, to promote their physical and digital access to research, education and society and to be compatible and connected with the international initiatives.

6.2.1 Governance

On January 22nd 2021, SwissCollNet Steering Board has started operating with a kick-off meeting. The Steering Board is in charge of formalising the aims and the functioning of the initiative into several documents: the rules of procedure (the interactions of the different governance bodies, the funding regulations (allocation of funds) and the calls for project proposals (content and regulations for each call).

6.2.2 National Strategy for Natural History Collections (2025-2035)

The first version of the National Strategy for Natural History Collections, based on a questionnaire that was sent to collection-holding institutions, was drafted by a sub-group of the Board of Experts. This document lists several strategic priorities such as standardized management practices, databasing and digitisation of specimens, unifying digital specimen data, giving physical and virtual access to biological and geological specimens, increasing the scientific use of natural history collections, enhancing the collections, developing training, education and societal impact, fostering collaborations, supporting networking between institutions, consolidating and managing funding and strengthening international connectivity.

This first version will be discussed and developed in close collaboration with the collection-holding institutions and other stakeholders, such as representatives from research institutions, representatives of higher education as well as representatives of science funding bodies. Several workshops will be run in order to refine the strategy, before being reviewed and commented by the Swiss natural history institutions.

The goal is to have a final document by 2024, ready for endorsement by the participating institutions and for the first steps of its implementation.

6.2.3 Survey on natural history collections

A priority of SwissCollNet is to make visible the diversity, the quality and the importance of the natural history collections of Switzerland. In order to get more detailed information about each collection, the survey on natural history collections in Switzerland carried out in 2018 will be updated in partnership with GBIF.ch. It will follow the structure of the Registry of Scientific Collections run by GBIF (GrSciColl), connected with Index Herbariorum, and will allow each institution to connect their collection data with their institution record in the registry, thus following international identifiers, indicators and standards. All collection-holding institutions will be warmly encouraged to participate, and all collections benefitting from SwissCollNet funds will be asked to be registered on GrSciColl.

The public availability of the survey results will provide a detailed picture of the Swiss collection landscape, give it an international visibility, strengthen the national network of collection-holding institutions and facilitate the future orientations of SwissCollNet.

6.2.4 SVNHC

A centralized virtual infrastructure for sharing and accessing specimen data and images of the Swiss natural history collections, referred to as the Swiss Virtual Natural History Collection (SVNHC), is a priority goal of SwissCollNet for 2024. Several technical solutions are possible and will be explored within the community, to ensure its adequacy and sustainability after 2024.

The Swiss landscape of the natural history collections is very heterogeneous, with respect to the number of collection-holding institutions, the size of their collections and their degree of digitisation (databasing as well as imaging of specimens). In a first step (preproject), the current situation and the requirements of the institutions have to be evaluated in parallel with the technical solutions best adapted for the SVNHC (usability, costs, collaboration and coordination with similar data repositories, sustainability model). Solutions for data standards and normalisation, minimal core requirements for data transfer as well as interoperability with other data repositories will be sought with the existing European or international organisations. The outcome of these analyses will constitute the reference for the development of the SVNHC.

6.2.5 Modernisation and digitisation of the Swiss natural history collections

To ensure the long-term preservation of natural history collections held in Switzerland, they should be curated to the best possible standards and stored in adequate conditions, as outlined in the "Handbook on natural history collections management - a collaborative Swiss perspective" (Frick & Greeff, 2021). With the compilation of the handbook, knowledge and collected experiences are illustrated and allow for the development and coordination on a national scale of management

standards, storage standards, emergency planning practices, pest management policies and risk mitigation.

Projects funded by SwissCollNet will rely on and implement the recommendations published in the handbook, with an emphasis on three fields: collection management, databasing/digitisation and training.

Collection management focuses on conditioning and integrating specimens into the collections and their databases, with an emphasis on un-accessioned objects or collections of particular national or international importance. It also includes the revision of existing databases and collections to modernise the scientific collections and facilitate data transfer with the SVNHC.

The long-term accessibility of the scientific community to the specimens held in the collections, both the physical objects and the digital information associated to them, requires their ongoing curation, **databasing and digitisation**. The focus lies on making specimen data digitally available and interconnected.

Implementing state-of-the-art quality standards for collection management, taxonomic revisions, modernisation and digitisation requires **training** opportunities for the collection managers and collection staff. The relevant training occasions may take place within specific projects in the Swiss collection-holding institutions as well as within the framework of exchange programmes with leading international museums.

6.2.6 Network development

Networking, engagement and exchange between natural history institutions is a very efficient and precious method to accomplish modernisation of natural history collections. In Switzerland, networking among natural history museums and botanical gardens is endorsed by musnatcoll. Together with musnatcoll, SwissCollNet has promoted collaborations and networking of persons being responsible for the collections in these institutions. A result of such activities at the national level is the "Handbook on natural history collections management – a collaborative Swiss perspective" (Frick and Greeff, 2021). This collective approach has worked towards the standardisation of workflows and harmonisation of specimen data during the digitisation process as well as on the challenges of specimen management.

Of similar importance are exchanges between the Swiss community and international programs. At the European level, networking, engagement and exchange between natural history collections take place via the Consortium of European Taxonomic Facilities (CETAF), which was founded in 1996 and now contains 71 member institutions from across EU and associated member states, including three from Switzerland. With its 25-year experience, CETAF concentrates a lot of expertise, plays an active role in several European projects and is developing knowledge in working groups on topics of interest for SwissCollNet such as collection management, specimen digitisation, data standards or taxonomy.

Based on the CETAF community, and currently under development for implementation in 2024 is the European programme Distributed System of Scientific Collections (DiSSCo, part of the European Research Infrastructure Roadmap). The aim of this research infrastructure is, based on national level membership and financial backing, to mobilise digital data from national history collections and to unite it to ensure that it is available for scientific research. Alignment of digital specimen and collection data with this developing infrastructure is an important goal for SwissCollNet as it will ensure interoperability.

SwissCollNet will continuously promote networking on a national and international level despite the latest political developments between Switzerland and the European Union, as participation of Switzerland in European projects and initiatives remains crucial for the Swiss research community.

On a national level, SwissCollNet will stay in close contact with the executive board of musnatcoll and organise conferences on a yearly basis that deal with specific questions, or that advance scientific understanding based on activities in natural history collections. For instance, knowledge exchange between collection-holding institutions about training opportunities implementation of

quality standards for collection management, internal revisions and for expanding collections as well as the exchange of highly specialised taxonomic expertise and aligning with international developments in the field, may be subjects of such conferences.

On an international level, SwissCollNet will stay in close contact with the specialised working groups of CETAF to strengthen collaboration and knowledge exchange between Swiss institutions and the CETAF community. Furthermore, SwissCollNet will interact with members of DiSSCo to closely follow the different steps of implementation of this infrastructure and exchange experiences and knowledge.

6.2.7 Long-term sustainability of the Swiss Virtual Natural History Collection

SwissCollNet has received funding from the Swiss Government to establish the SVNHC and to support the conditioning, modernisation and digitisation of natural history collections from 2021 to 2024. Successful project applicants will contribute to the initiative with an equal amount of money to match the received funds on a 1:1 ratio. A central mission of SwissCollNet during this four-year period is to ensure the sustainability of the initiative, through the identification of an institution or a consortium that will take over with the necessary financial means. This is interdependent with the development of the SVNHC since the choice of the data repository or aggregation structure will influence the business model for its future management.

Several options have been discussed and will be evaluated in parallel with the development of the SVNHC. The main scenarios are described below, the solution that SwissCollNet will develop and implement may consist in a combination of those.

Scenario 1, GBIF.ch, as the national biodiversity data aggregator, or other data centres (Info Species):

GBIF.ch, the national data node of GBIF international, is supported by the Confederation as part of their membership obligations. Substantial investments have been made to develop the Swiss node, its role as the national data aggregator for biodiversity and as the conduit for data from Switzerland to GBIF international. The processes and infrastructure that have been put in place to deal principally with observation data manifest similarities to those needed to aggregate specimen data. The current system could be adapted to allow institutions without their own internal database to enter their data via the GBIF.ch platform. This would request restructuration and expansion of the GBIF.ch platform to adopt it for collection data. Furthermore, the platform would need to be developed and opened for data from geoscientific collections such as rocks, minerals and meteorites. Building a specimen aggregation capacity onto an existing system may be more cost-effective than starting something from the beginning. This may also facilitate the regrouping of all biodiversity data on both Swiss and global biodiversity held within Switzerland and with including also geodiversity data increase accessibility to important knowledge for environmental sciences. The SVNHC would also be facilitated, as long as the data connectivity (aggregation processes) is put in place with natural history objects in mind. Many Swiss collection-holding institutions already collaborate with this platform.

Scenario 2, public institution/organisation or a consortium of institutions/organisations:

It is possible that a single institution/organisation may decide to take on the responsibility to SVNHC for Switzerland. This model however implies that the costs would be supported by a single institution, and the sustainability model is more precarious. A likely alternative would consist in the creation of a consortium of institutions/organisations to integrate their current institutional database systems and existing collections catalogues together to form a nation-wide platform. The institutional database may also be extended to allow institutions without their own internal database to enter data on their collections and thus make them available via the SVNHC. musnatcoll may play a pivotal role in this scenario, as most collections are members and musnatcoll recently has directed its focus on collections and has established a unit for collections.

Scenario 3, SwissBioCollection via support from institutions of higher education, swissuniversities:

Under the development of the Biology Roadmap for Research Infrastructures 2025-2028 by the Swiss Biology Community a proposal to create the SwissBioCollection has been developed. This initiative joins natural history collections and non-medical biobanks (DNA, tissues, seed-banks), with the aim of creating a common infrastructure to support the scientific use of collections in and across Switzerland. The SVNHC could become part of this initiative, if it was supported by an institution of higher education and accepted onto the future federal Roadmap.

6.3 Type of projects and funding schemes

Within SwissCollNet, two types of projects and two funding schemes are provided for:

1. Projects for infrastructure implementation will be designed by the governance bodies of SwissCollNet (top-down). Funding will be regulated with service level agreements.
2. Institutional or inter-institutional projects will be competitive and be chosen upon evaluation during two calls for project proposals, using criteria defined by the SB.

Swiss public and non-profit institutions holding natural history collections are invited to submit project proposals which aim at conditioning, modernizing and digitizing their collections. A strong emphasis should be put on transversal aspects and collaborations. The integration of small collections into projects with transversal objectives is highly recommended.

7 Implementation calendar

The implementation of SwissCollNet will be the following and is summarised in the figure below.

A. Governance structure

SwissCollNet governing bodies have been put in place and have become operational in the first quarter of 2021. The regulation documents needed to run the initiative will be validated by the Executive Board of SCNAT and the SERI by 30th September, 2021.

Annual planning (AP) and project reporting (PR) to the SERI are scheduled every year.

B. Two calls for project proposals

A first call for project proposals will be launched in October 2021, with the earliest start of the funded projects in April 2022. A second call for project proposals will follow in May 2022 with an earliest start of the funded projects in November 2022. All projects will have to be finished at the end of December 2024. In the case that essential elements for the success of the initiative are not covered with projects resulting from the two calls, the Steering Board may consider allocations of the budget to specific projects or to an additional call for project proposals.

C. Development of the SVNHC

The development of the SVNHC will be implemented in four phases: 1/ a preproject in the second semester of 2021 to identify the available options and select the best solution, 2/ the emission of a call for tenders to implement the infrastructure in early 2022, 3/ the implementation of the infrastructure (until mid 2024) and 4/ the first steps of operation with data transfers from the collections.

D. Collection survey

The survey on natural history collections will be prepared and tested during the first two quarters of 2021. The collections will be asked to fill in the survey starting in September 2021 with the goal to have returns from as many collections as possible at the end of 2021, beginning of 2022. The received information will be uploaded on the international collection registry of scientific collections of GBIF (GrSciColl) and published on the SwissCollNet website in early 2022.

E. Network development

A yearly workshop or conference will be organised. Collection-holding institutions will be invited to exchange knowledge on themes or key topics linked with the missions of SwissCollNet, as well as network among themselves and with international partners. Exchanges with international consortia and programs such as CETAF and DiSSCo will take place regularly during the entire period of SwissCollNet.

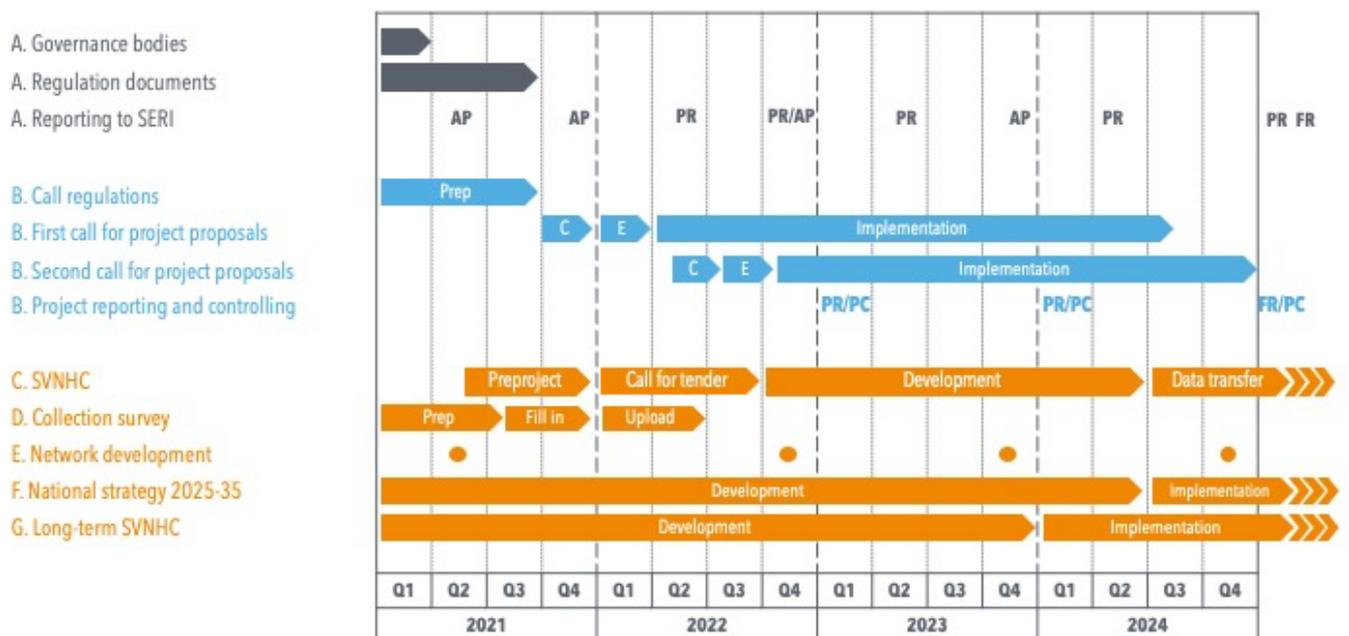
F. National strategy 2025-2035

The National Strategy for Natural History Collections 2025-2035 will be discussed and finalized in 2024.

G. Long-term sustainability of the SVNHC

A strategy for long-term sustainability of SwissCollNet will be developed during the first three years of the initiative and implemented in 2024.

Figure 2: implementation calendar of SwissCollNet (AP = Annual planning; PR = progress report; PC = project controlling; FR = final report; Prep = preparation; C = call; E = evaluation)



8 Budget

8.1 Federal contributions

The Federal contributions are divided into annual rates, as defined in the budget of the pluriannual plan of the Academies of Arts and Sciences, and into the categories SwissCollNet management, collection conditioning, databasing and digitisation, formation and training, as defined in the Zusatzprotokoll signed between the SCNAT and SERI. Projects conducted by SCNAT (survey, strategy, workshops and conferences) are included in the SwissCollNet management category, the construction of the SVNHC is included in the category of databasing and digitisation. In total, the amount of CHF 9.43 Mio will be accredited to two calls of project proposals for bottom-up projects submitted by Swiss collection-holding institutions.

Table 1: fund allocation of the federal funding

SwissCollNet Budget 2021 - 2024					
	2021	2022	2023	2024	Total 21-24
SwissCollNet Management					
Management, coordination	208000	634900	582'100	465'000	1'890'000
Workshops and conferences	5000	5000	10'000	10'000	30'000
Collection strategy	2000	2000		10000	14'000
Collection survey	2000	4000			6'000
Collection conditioning					
Projects of calls	1000000	812500	627000	810500	3'250'000
Databasing and digitisation					
SVNHC data-repository	96000	304000	300'000	300'000	1'000'000
Projects of calls	1147000	917600	1085400	750000	3'900'000
Formation and training					
Projects of calls	570000	570000	645500	494500	2'280'000
Total	3030000	3250000	3250000	2840000	12'370'000

8.2 Matching funds

Projects that will be financed by SwissCollNet will contribute with an equal amount of cash and/or in-kind investments in their projects. Furthermore, numerous experts from collection-holding institutions and institutions of higher education will participate in projects led by SwissCollNet directly, such as the collection survey, the national strategy for natural history collections, the construction of the SVNHC, and training activities. Their contributions are calculated as defined (see Appendix IV). Currently, CHF 238'500.– additional matching funds have to be looked for to match the federal contributions with an equal amount of money. This is partially due to the fact, that it is not yet known in what way the SVNHC will be built. Once defined (by the end of 2021), matching funds for the construction of the SVNHC will be determined (in cash/in-kind).

Table 2: matching contributions**Matching funds Institutions and Experts
Budget 2021 - 2024**

	2021	2022	2023	2024	Total 21-24
SwissCollNet Management					
Management (SB + BoE)	274000	371200	274000	338800	1'258'000
Workshops and conferences	20000	20000	20000	20000	80'000
Collection strategy	48000	120000	120000	120000	408'000
Collection survey	418200	32200	24550	24550	499'500
Long-term SVNHC	24000	24000	24000	24000	96'000
Collection conditioning					
Projects of calls	1000000	812500	627000	810500	3'250'000
Databasing and digitisation					
SVNHC data-repository	70000	70000	70000	70000	280'000
Projects of calls	1147000	917600	1085400	750000	3'900'000
Formation and training					
Projects of calls	570000	570000	645500	494500	2'280'000
Expert group	20000	20000	20000	20000	80'000
Total	3591200	2957500	2910450	2672350	12'131'500

9 Conclusions

The SwissCollNet initiative is an incredible opportunity for Switzerland to develop and modernise its natural history collections. The mobilisation of specimen data, the development of the Swiss Virtual Natural History Collection (SVNHC) and the integration of the information into international biodiversity data aggregators will enhance research on biodiversity as well as favour environmental and climatic change studies. Workshops and training projects will increase networking activities and collaborations of institutions, thus creating opportunities for knowledge exchange on collection management and taxonomic expertise. Finally, by the endorsement of a National Strategy for Swiss Natural History Collections, Swiss institutions will unite their strengths and expertise to develop the use of the collections in their charge, promote interoperability of the data, ensure physical and digital access to the collections by Swiss and international researchers, thus contribution to scientific research and excellence.

10 References

- Brunner D, Durinx C, Erb M, Fischer M, Hari Y, Jazwinska A, Leeb T, Reymond C, Scheidegger C, Stieger P, Studer B, Vergères G, Walter A (2021) Biology Roadmap for Research Infrastructure 2025-2028 by the Swiss Biology Community. Swiss Academies Reports 16 (2)
 CETAF: <https://www.cetaf.org>
 DiSSCo: <https://www.dissco.eu>
 ESFRI: <https://www.esfri.eu>
 Frick H, Greeff M (2021) Handbook on natural history collections management - A collaborative Swiss perspective. Swiss Academies Communications 16 (2)
 GBIF: <https://www.gbif.org>
 GBIF Registry of Scientific Collections: <https://www.gbif.org/fr/grscicoll>
 Index Herbariorum: <http://sweetgum.nybg.org/science/ih>
 Swiss Academies of Arts and Sciences (2019), Natural significance of natural history collections in Switzerland. Swiss Academies Reports 14 (2).

11 Appendices

Appendix I - Members of the governing bodies

Members of the Steering Board of SwissCollNet:

- Christoph Scheidegger, WSL, president of SwissCollNet;
- Peter Wandeler, Naturhistorisches Museum Fribourg, co-president of musnatcoll; vice-president of SwissCollNet;
- Britta Allgöwer, former director of Natur-Museum Luzern;
- Felix Althaus, former delegate of the Executive Board of the University of Zürich, responsible for the project "Museums and collections";
- Walter Berendsohn, Botanic Garden and Botanical Museum Berlin, Freie Universität Berlin;
- Ana Casino, Consortium of European Taxonomic Facilities (CETAF), Distributed System of Scientific Collections (DiSSCo);
- Daniel Croll, University of Neuchâtel;
- Christophe Dufour, former director of the Muséum d'histoire naturelle de Neuchâtel;
- Stefan Eggenberg, InfoFlora and University of Bern;
- Wibke Kolbmann, Museumslandschaft Hessen Kassel;
- Barbara König, Executive Board SCNAT and University of Zürich;
- Hendrik Vogel, University of Bern

Members of the Board of Experts of SwissCollNet:

- Alice Cibois, Natural History Museum of Geneva and Swiss Systematics Society;
- Nadir Alvarez, Natural History Museum of Geneva and GBIF.ch;
- Loïc Costeur, Naturhistorisches Museum Basel;
- Werner Eugster, ETH-Zürich;
- Holger Frick, Naturhistorisches Museum Basel;
- Michael Greeff, ETH-Zürich;
- Michelle Price, Conservatory and Botanical Garden of Geneva and CETAF

Members of the Scientific Unit SCNAT:

- Pia Stieger, head;
- Aline Dépraz, scientific collaborator

Appendix II - Institutions and organisations involved

musnatcoll, GBIF.ch, the Swiss Society of Systematics and Info Species are represented in the Steering Board and/or the Board of Experts. So far, 36 collection-holding institutions have signed a letter of support for the initiative SwissCollNet:

- AG Naturama Aargau
- BE Botanischer Garten, Universität Bern
- BE Naturhistorisches Museum Bern
- BL Museum.BL
- BS Botanischer Garten, Universität Basel
- BS Naturhistorisches Museum Basel
- FR Musée d'histoire naturelle, Fribourg
- FR Botanischer Garten der Universität Freiburg
- GE Conservatoire et Jardin botaniques, Ville de Genève
- GE Muséum d'histoire naturelle et musée d'histoire des sciences, Ville de Genève
- GR Bündner Naturmuseum
- JU Jurassica
- LU Natur-Museum Luzern
- NE Muséum d'histoire naturelle, Ville de Neuchâtel
- NE Musée d'histoire naturelle, Ville de La Chaux-de-Fonds
- NE Jardin botanique, Ville de Neuchâtel
- SG Naturmuseum St.Gallen
- SH Museum zu Allerheiligen, Schaffhausen
- SO Naturmuseum Olten
- SO Naturmuseum Solothurn
- TG Naturmuseum Thurgau
- TI Museo cantonale di storia naturale, Lugano
- VD Musée cantonal de zoologie, Lausanne
- VD Musée cantonal de géologie, Lausanne
- VD Musée et jardins botaniques cantonaux
- VS Musée de la Nature, Canton du Valais
- ZH Universität Zürich & ETH Zürich, Vereinigte Herbarien
- ZH ETH Zürich, Entomological Collection
- ZH ETH Zürich, Fachgruppe Georessourcen Schweiz
- ZH Zoologisches Museum, Universität Zürich
- ZH Sukkulente-Sammlung, Stadt Zürich
- ZH Institut für Systematische und Evolutionäre Botanik, Universität Zürich
- ZH Paläontologisches Museum, Universität Zürich
- ZH Kulturama
- ZH Sauriermuseum Aathal, Aathal
- ZH Naturmuseum Winterthur

Appendix III - Mandate of SwissCollNet

Based on Article 10, paragraph 5 letter h of the Statutes and Article 2 paragraph 7 of the Rules of Procedure of the Swiss Academy of Sciences (GO SCNAT), the Executive Board confers the following mandate¹:

Article 1 Purpose and integration within SCNAT structures

- ¹ The Swiss Natural History Collections Network (SwissCollNet) is a national infrastructure for the preparation, digitisation and provision of access to natural science collections in Switzerland for the benefit of research and other uses. As part of the 2021-2024 ERI Dispatch of the Swiss Confederation, SCNAT is tasked with building this infrastructure and ensuring its long-term future.
- ² A working group of the SCNAT Executive Board under the name "Steering Board SwissCollNet" is entrusted with this task.
- ³ The Steering Board supports achievement of objectives by:
 - allocating funds to projects that serve to achieve the objectives.
 - supporting the establishment of an institution that is capable of maintaining and further developing SwissCollNet in the long term.

Article 2 Bodies

- ¹ The bodies that make up SwissCollNet are the "Steering Board" (hereinafter SB) and the "Board of Experts" (hereinafter BoE).
- ² Overall responsibility for SwissCollNet is assigned to the SB by the SCNAT Executive Board, and the SB is authorised to represent SwissCollNet externally.
- ³ The BoE advises the SB on compliance with technical requirements by the projects supported by SwissCollNet.

Article 3 Composition, election, term of office and compensation of the boards

- ¹ The SB, including the President, consists of 9 to a maximum of 11 persons with knowledge of the Swiss and European collections landscape, the Swiss natural science research landscape, digital data collections and Swiss politics. The election of the SB members and President, and the term of office to be served, are based on the GO SCNAT. The Chair of the BoE takes part in Steering Board meetings *ex officio* in an advisory capacity. A delegate of the SCNAT Executive Board attends the meetings of the Steering Board in an advisory capacity.
- ² The BoE consists of up to 9 persons with sound knowledge of the requirements for collections and their digitisation, including in the context of comparable international initiatives, plus extensive practical experience in relation to collections. They are appointed by the SB, with no limit to the term of office. The SB appoints a Chair of the BoE. The BoE may call upon individuals or groups of individuals with the relevant specialist qualifications for support in dealing with specific issues in its work at any time.
- ³ SB and BoE constitute themselves internally (e.g., nomination of deputies and specific responsibilities).
- ⁴ Members of these boards do not receive a salary. Expenses incurred in the execution of their duties as members of these boards may be reimbursed.

Article 4 Objectives

SwissCollNet pursues the following objectives:

- a) To develop a long-term strategy for managing Swiss natural science collections, using them for scientific purposes and obtaining funding for their maintenance and further development.
- b) To digitise and publish information on specimens as part of a decentralised research infrastructure for Swiss natural science collections, which will lead to the creation of a virtual Swiss Natural History Collection and a collaborative research platform.
- c) To promote the scientific and educational use of the Swiss natural science collections both nationally and internationally, and encourage training for scientific and technical careers related to natural science collections.
- d) To involve the Swiss natural science collections in international efforts to coordinate the mobilisation of biodiversity and geodiversity data for the benefit of research by creating a national research infrastructure for scientific collections.

Article 5 Tasks of bodies

¹ The Steering Board performs the following tasks:

- Drawing up a set of rules on cooperation within and between the two boards, in particular regarding tasks, competences and responsibilities in conducting a call for proposals or papers (Organisational Regulations). The regulations must be approved according to the provisions in the «Zusatzprotokoll» to the Service Agreement between SERI and the Swiss Academies of Arts and Sciences.
- Preparation of regulations for the funding of projects (Funding Regulations). The regulations must be approved by the SCNAT Executive Board and according to the provisions in the «Zusatzprotokoll» to the Service Agreement between SERI and the Swiss Academies of Arts and Sciences.
- Drawing up the calls for proposals for ratification by the Executive Board. In doing so, the SB observes the standards and requirements set by the BoE for operating the infrastructures and connecting them to international infrastructures. Managing the call procedure in accordance with the Organisational Regulations.
- Managing the review process for submitted project applications, in consultation with the BoE and in accordance with the Organisational Regulations.
- Deciding on the allocation of funds in accordance with the Funding Regulations, in consultation with the BoE and in accordance with the Organisational Regulations, for ratification by the SCNAT Executive Board.
- Taking steering decisions on current projects on the basis of the respective progress reports and technical accompanying reports of the BoE, in accordance with the Organisational Regulations.
- Producing consolidated annual reports and the final report for the attention of the SCNAT Executive Board.
- Appointing members of the BoE.
- Informing stakeholders, in particular institutions with collections, about the project.
- Organising workshops on the coordinated development of SwissCollNet.
- Bearing responsibility for strategic and organisational aspects of connecting SwissCollNet to international initiatives.
- Actively engaging in a dialogue with the political and administrative bodies responsible for collections at the national and cantonal levels.
- Preparing SwissCollNet for handover to an organisation suited to running normal operations and further developing the infrastructure.

² The Board of Experts performs the following tasks:

- Bearing responsibility for technical aspects of connecting SwissCollNet to international initiatives.

- Defining the required standards for a national research infrastructure with international connectivity.
- Monitoring developments at the international level and adjusting the standards that apply to SwissCollNet to ensure its connectivity.
- Preparation of the elements in calls for proposals or papers that relate to compliance with technical standards and requirements in accordance with the Organisational Regulations.
- Supporting the SB in the review process in accordance with the Organisational Regulations.
- Supporting the SB in funding decisions in accordance with the Organisational Regulations.
- Producing reports to accompany the progress reports on current projects, covering aspects relating to compliance with technical standards and requirements, in accordance with the Organisational Regulations.

Article 6 Scientific unit

- ¹ The Scientific unit of the Steering Board SwissCollNet is run by SCNAT in accordance with its regulations and with the support of the Service units (IT, Finances, Human Resources, Communications etc.).
- ² The Scientific unit assists all the SwissCollNet bodies in the performance of their tasks.

Article 7 Financial sources and contracts

- ¹ SwissCollNet is financed via the Federal Dispatch on the Promotion of Education, Research and Innovation (ERI-dispatch) together with the procedures regulated in the "Zusatzprotokoll" to the Service Agreement between SERI and the Swiss Academies of Arts and Sciences (ZP).
- ² The financing of projects by SwissCollNet from federal funds requires an own contribution from the implementing institutions. The details are set out in the ERI dispatch and the ZP.
- ³ The financial management (accounting, reporting, etc.) is carried out in accordance with the regulations of SCNAT.
- ⁴ Contracts in the name of SwissCollNet are concluded in the name of SCNAT and in accordance with the provisions of the SCNAT Financial and Signature Regulations.

Article 8 Entry into force and validity of the mandate

- ¹ This mandate comes into force on 1 January 2021.
- ² As required and when the time comes, the partners in question will set down their own rules regarding the transfer of tasks, competences and responsibilities to an institution outside SCNAT (see Art.1, para. 3).
- ³ Any amendments to or revocation of the SwissCollNet mandate require a decision by the SCNAT Executive Board.

Appendix IV – Maximum salaries eligible as matching funds

The salaries of the staff employed or hired in the institution(s) can be eligible as matching funds (in kind) for the part of their activities that will be spent on implementing the project supported by SwissCollNet.

In the budget submitted in the project proposal, the effective costs of the salaries have to be indicated including social charges (20%) and overheads (15% of salary costs including social charges).

These salary costs cannot exceed the maximal amounts indicated in the following table.

Table 1: maximum eligible salary rates for personnel (cost covered by SwissCollNet or in kind contribution)

Function	Max costs applicable* [kCHF]
Leading position (professor, director, head, ...)	270
Senior collaborator with leading function (assistant professor, curator, collection manager,...)	200
Scientific collaborator (researcher fellow, postdoc, curator, collection manager, ...)	170
Junior collaborator (research fellow, assistant collection manager, assistant curator, ...)	150
Senior technician (IT, taxidermist, collection technician, ...)	130
Junior technician (IT, taxidermist, collection technician, ...)	100
Doctoral student	60
Internship/temporary staff (IT, collection, civil service...)	Effective costs only

* = effective salary + 20% social charges + 15% overhead services, infrastructures. To be calculated pro rata.