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Federal Department of Defence,
Civil Protection and Sport DDPS
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Federal Departement of Home Affairs FDHA
Swiss Federal Archives SFA

Archiving of federal geodata

Handbook

Version 1.0, 5 December 2016

All passages highlighted yellow are to be modified where necessary after the decision by the SFA and swisstopo directorates on the open questions concerning the delivery date.

Change log, review, approval

Version	Date	Description, comment	Name or role
1.0	05/12/2016	Version for SFA management and swisstopo management	Project team Ellipse
	13/12/2016	Decision by SFA management and swisstopo management	
	dd/mm/2017	Decision by GCS	

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- TIFF+EWF.XML information sheet
- Conservation and archive planning 2016
- Valuation decision for federal geodata 2016
- Implementation report on conservation and archive planning for the Swiss Federation
- Geo-SIP and geo-dossier specification

Glossary: Terms and abbreviations

Term	Abbreviation	Definition
Archival Information Package	AIP	Archival Information Packages result from SIPs during the process of archiving digital documents. They represent the form of information packages in which digital documents are stored in the digital repository.
Archive Information Systems	AIS	Central software in the SFA which manages information concerning analogue and digital archive holdings.
Archiving		Secure and permanent conservation of documents in an archive, which are valuable from a legal, administrative, political, economical, historical, cultural, social and scientific perspective. Documents that are defined as having archival value are transferred into an archive in an ordered fashion and are made usable for public and private bodies in accordance with the legal provisions.
Archiving Act	ArchA	Federal Act of 26 June 1998 on Archiving, SR 152.1
Archiving Ordinance	ArchO	Ordinance of 8 September 1999 to the Federal Act on Archiving, SR 152.11
Archivable		The SFA define the file formats that are regarded as archivable (suitable for archiving). Such formats have to meet the SFA's requirements for the preservation of digital documents.
(Of) archival value		Documents that are defined as having archival value encompass documents of the federal government that are of legal or administrative importance or contain valuable information (i.e. documents that are valuable from a historical, social or cultural point of view).
Conservation and archiving planning	CAP	Planning includes the appraisal of the conservation period in long-term availability and the appraisal for archival value of the geodata.
Appraisal		Process by which the archival value of documents is determined on the basis of reviewable criteria.
Federal Office of Topography	swisstopo	swisstopo is the geoinformation centre of Switzerland. It is responsible for collecting, managing and making available spatially related data. swisstopo measures Switzerland, and records and documents the landscape and the subsurface.
Federal Spatial Data Infrastructure	FSDI	The FSDI enables the efficient use and exchange of federal geodata.
Business Process Model and Notation	BPMN	Business Process Model and Notation is a graphic specification language in business informatics and process management. It provides symbols with which technical, methodology and informatics specialists can model and document business processes and workflows.
Presentation models		Descriptions of graphical presentations for the visualisation of geodata (e.g. in the form of maps and plans). By separating the graphical symbolisation from the geodata, different presentations can be generated from one collection of geodata.

Term	Abbreviation	Definition
Digital Information Repository	DIR	System that supports ingest, access, preservation and data management based on the OAIS.
Dissemination Information Package	DIP	A DIP is a container for dossiers that are requested by a user via an ordering procedure.
Dossier		This term refers to all documents relating to a specific business matter. A dossier basically corresponds to a business matter. However, by combining similar business matters or dividing dossiers into subdossiers, this basic structure can be adapted to meet the corresponding needs. The compilation of dossiers is carried out on the basis of the classification system.
Extensible Markup Language	XML	Data format for displaying hierarchically structured data in the form of text files.
Official geodata		Geodata that are based on a legislative enactment of the Confederation, a canton or a commune (Art. 3 GeoIA). They are binding on the owner or the authorities, should this be prescribed by the legislator.
Official geodata of the Confederation		Official geodata under federal legislation for which responsibility lies with the Confederation in accordance with Art. 8 para. 1 GeoIA.
Official geodata under federal legislation		Official geodata under federal legislation are based on the legislation of the Confederation; data ownership lies at the federal, cantonal or communal level. The official geodata under federal legislation are listed in Annex 1 GeoIO “Catalogue of official data under federal legislation”.
Geodata		Spatially related data that are related in time to the dimensions and characteristics of certain spaces and objects and in particular their position, nature, use and legal relationships (Art. 3 GeoIA).
Geodata models		Depiction of reality that determines the structure and content of geodata independent of system (Art. 3 GeoIA).
Geodata service		Network application which facilitates and simplifies the use of electronic services for geodata and allows access to structured geodata (Art. 3 GeoIA).
Geography Markup Language	GML	Data interchange format for geographical features.
Geoinformation		Geospatial information obtained through combination of geodata (Art. 3 GeoIA).
Geoinformation Act	GeoIA	Federal Act of 5 October 2007 on Geoinformation, SR 510.62
Geographic information system	GIS	Information system for recording, processing, organising, analysing and presenting spatial data.
Geoinformation Ordinance	GeoIO	Ordinance of 21 May 2008 on Geoinformation, SR 510.620

Term	Abbreviation	Definition
Geospatial metadata		Formal descriptions of the characteristics of geodata, for example their origin, content, structure, validity, up-to-dateness, accuracy, rights of use, access or methods of processing (Art. 3 GeoIA).
Geospatial metadata 2003	GM03	Swiss metadata model for geodata (SN 612050; profile of international metadata standard ISO 19115)
Federal geodata portal	geo.admin.ch	Geodata information platform for location-based information, data and services of the federal government.
Geospatial reference data		(Official) geodata which serves as the geometric basis for other (official) geodata (Art. 3 GeoIA).
Geocoding		Attribution of spatially related reference information to a data set.
Historicisation		Recording the type, extent and time of modifications of data with the aim of being able to reconstruct any legal status, with adequate certainty and reasonable effort, within a useful period. In contrast with data backup, historicisation is controlled by changes to the data (in accordance with Art. 2 para. b GeoIO).
International Standard Archival Description (General)	ISAD(G)	International application standard for describing archival documents.
Coordinating agency for federal geographical information	GCG	The coordination of geographical information within the Federal Administration is under the strategic direction and management of the coordinating agency for federal geographical information.
Centre for the Coordination of Permanent Archiving of Electronic Documents	KOST	Centre for the Coordination of Permanent Archiving of Electronic Documents of the Swiss Confederation with the cantons and the Principality of Liechtenstein.
Metadata		Metadata can be described as “information about primary data” (data about data), since they have a descriptive nature. They are data that contain information about features of other data.
Metadata catalogue for Swiss geodata	geocat.ch	Catalogue for recording and looking up geospatial metadata.
Long-term availability	LA	Conservation of official geodata in a way that ensures their long-term preservation in terms of quantity and quality and the provision of the data holdings in an easily accessible form for active use. In addition to the current data holdings, specifically defined older data holdings (in the sense of a time series) should also be made available.
SFA Online Search	OLS	A software-independent online search tool for archival metadata.
Open Archival Information System	OAIS	A reference model for a dynamic, expandable archive information system (ISO standard 14721:2012); the most important standard for electronic archiving.
Provenance principle		A principle for arranging archives that forms the basis for classifying and describing archive records by their origin and the context of their creation.

Term	Abbreviation	Definition
Closure period		Access to archive records is regulated by closure periods. Documents that are still subject to a closure period may only be viewed if this has been approved in an official approval procedure. (This does not apply to the submitting authority itself.) Access is regulated by the provisions of Articles 9 to 16 ArchA.
Swiss Federal Archives	SFA	The SFA are the federal service and competence centre for long-term information management. They advise the federal government on the documentation of its activities and store data, documents, photos, films, audio recordings and other documents.
Software Independent Archiving of Relational Databases	SIARD	Software for archiving relational databases, based on the open file format SIARD and the associated software SIARD Suite.
Submission Information Package	SIP	SIPs are information packages that are submitted to the archive by the submitting authorities. They contain digital documents (primary data and metadata).
Documents		Documents as defined by the Federal Archiving Act are all recorded information, irrespective of the medium, that is received or produced in the fulfilment of the public duties of the Confederation, as well as all finding aids and supplementary data that are required in order to understand and use this information (Article 3 para. 1, ArchA).
Swiss Association for eGovernment Standards	eCH	The association promotes, develops and adopts E-Government standards whose objectives are based on Switzerland's E-Government strategy.
XML Schema Definition	XSD	Recommendation for defining structures for XML documents. Uses a complex schema language to describe data types, individual XML schema instances (documents) and groups of such instances.
Access authorisation levels		Official geodata are assigned to one of 3 access authorisation levels (Art. 21 GeoIO): A: publicly accessible official geodata B: official geodata with limited public accessibility C: official geodata that are not publicly accessible
Authority responsible		Authority which, under the law, is responsible for the collection, updating and management of the official geodata (Art. 8 para. 1 GeoIA).

1 Background

1.1 Legal basis

1.1.1 Federal archiving legislation

The Swiss Federal Archives (SFA) are the federal service and competence centre for long-term information management. In accordance with the Federal Archiving Act (ArchA),[1] they are responsible for appraising, saving, conserving and transmitting the Confederation's documents. This also applies to digital documents.

1.1.2 Geoinformation legislation

Switzerland has had a modern Geoinformation Act (GeoIA) since 2008[2]. This regulates all aspects of recording, updating, conservation and use of geodata that have a basis in federal legislation.

Geodata generally comprise digital data to which a specific spatial position can be assigned, or, according to the definition in the GeoIA: "Spatially related data that are related in time to the dimensions and characteristics of certain spaces and objects and in particular their position, nature, use and legal relationships"[3]. Geodata are usually created, managed, updated and used in a geographic information system (GIS). According to the definition in the GeoIA, official geodata are "geodata that are based on a legislative enactment of the Confederation, a canton or a commune"[4]. Official geodata can be further divided into geospatial reference data and thematic geodata. Geospatial reference data serve as the geometric basis for further geodata. Thematic geodata are geodata from a specific specialist area (e.g. environment, statistics, transport) Geospatial metadata should also be mentioned here – these describe the actual spatial data. According to GeoIA, geospatial meta data are "a formal description of the characteristics of geodata, for example their origin, content, structure, validity, up-to-dateness, accuracy, rights of use, access or methods of processing"[5].

According to Art. 9 GeoIA, the availability of the official geodata must be guaranteed in two ways: firstly, every responsible authority (according to Art. 8 para. 1 GeoIA) is responsible for the long-term availability of its official geodata. Secondly, archiving includes the official geodata for which the SFA

[1] Federal Archiving Act, SR 152.1 https://www.admin.ch/opc/en/classified-compilation/19994756/index.html
[2] Federal Geoinformation Act, SR 510.62 https://www.admin.ch/opc/en/classified-compilation/20050726/index.html
[3] Art. 3 para. 1a GeoIA
[4] Art. 3 para. 1c GeoIA
[5] Art. 3 para. 1g GeoIA

are responsible (

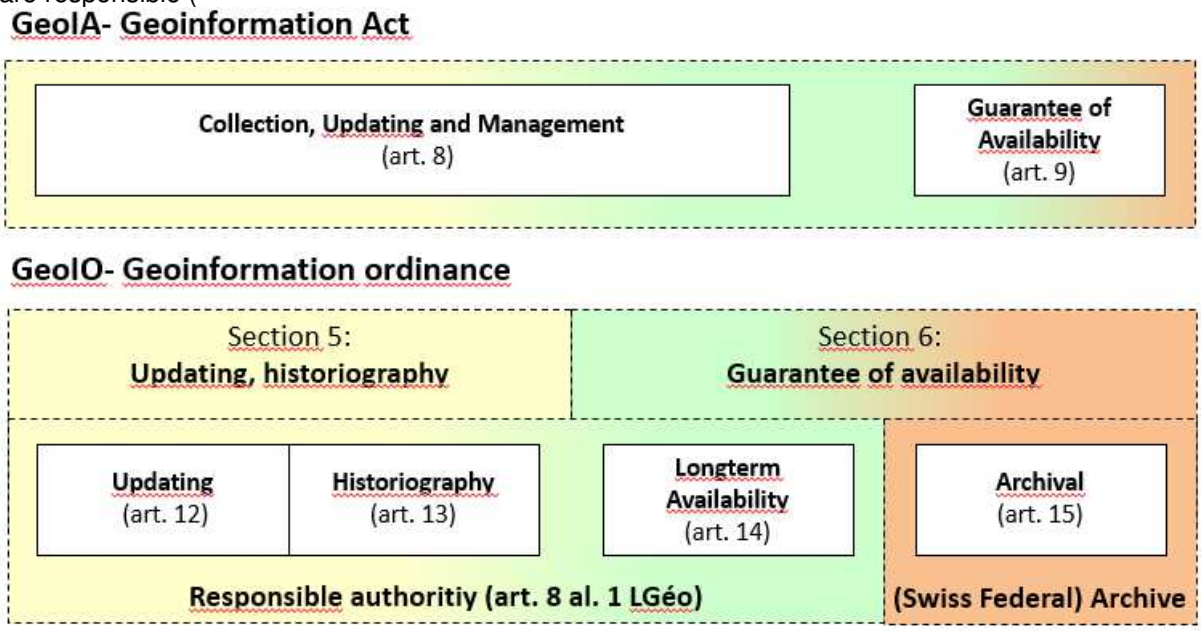


Figure 1).

GeoIA- Geoinformation Act
Collection, Updating and Management
(art. 8)
Guarantee of Availability
(art. 9)
GeoIO- Geoinformation ordinance
Section 5:
Updating, historiography
Section 6:
Guarantee of availability
Updating
(art. 12)
Historiography
(art. 13)
Longterm Availability
(art. 14)
Archival
(art. 15)
Responsible authoritiy (art. 8 al. 1 LGéo)
(Swiss Federal) Archive

Figure 1: Legal basis

If the responsibility (according to Art. 8 para. 1 GeoIA) for the official geodata under federal legislation lies with the canton, this canton specifies the body that is responsible for archiving by way of its own legislation (Art. 15 para. 2 GeoIO). The long-term availability and archiving of official geodata under federal legislation by the cantons and in cantonal archives requires – not least for economic reasons – coordination between the Confederation and the cantons.

1.2 Preliminary study, Ellipse concept report and handbook

Following the entering into force of the geoinformation legislation, the Federal Office of Topography (swisstopo) – as the representative of the coordinating agency for federal geographical information (GCG) – and the SFA implemented this for the archiving of federal geodata.

In 2009 and 2010, a joint preliminary study “Archiving of geodata” [6]was prepared. From 2011 to 2013, the concept report “Concept for the archiving of official geodata under federal legislation”[7] was drawn up as part of Project Ellipse on the basis of this preliminary study. The archiving of federal data was carried out between 2013 and 2016 on the basis of the Ellipse concept and documented in this handbook for the purposes of operational implementation.

1.3 International context

While the preliminary study was being prepared and the Ellipse concept developed, the SFA and swisstopo were participating in the EuroSDR archiving working group[8] and making a significant contribution to the drawing up of “GI+100: Long term preservation of digital Geographic Information - 16 fundamental principles agreed by National Mapping Agencies and State Archives”[9], which was published in 2013.

These principles also form a material basis for the current ongoing activities (as of 2016) to develop an “ISO Standard for the Preservation of Geospatial Data and Metadata: ISO 19165”[10]. Therefore, this standard cannot yet be included/met in the current version of this handbook. The ISO 19165 standard will enter into force in late 2017 at the earliest according to the ISO/TC 211 Programme of work[11]. A decision must then be made as to whether and in which areas the archiving of federal geodata in Switzerland must be adapted in line with this ISO standard.

2 Introduction

2.1 Aim and purpose of the handbook

The aim of this handbook is to summarise all the relevant results from the realisation of the Ellipse concept in a single document. This handbook will be updated to include future changes or additions to the processes. This handbook serves as a set of instructions for the archiving of federal geodata for all involved parties, responsible authorities and the SFA.

2.2 Scope of application of the handbook

This handbook describes the procedure for archiving *official geodata of the Confederation* (according to the appendix to GeoIO – official geodata catalogue) and *other federal geodata* (as listed in Art. 2 para. 2 GeoIA). This handbook also applies to all federal authorities that produce geodata, make it available in the long term and must deliver it to the SFA (authorities responsible according to Art. 8 para. 1 GeoIA).

2.3 Principles

2.3.1 The SFA’s principles

The SFA already have solutions in place for the archiving of digital documents in general. Digital documents are archived at the SFA in accordance with the following principles[12]:

[6] https://www.swisstopo.admin.ch/content/swisstopo-internet/de/topics/geoinformation/landscape-memory/longterm-conservation/geo-archive/_jcr_content/contentPar/tabs/items/dokumente/tabPar/downloadlist/downloadItems/416_1457703784075.download/vorstudiezurarchivierungvongeodatende.pdf (in German)
[7] https://www.swisstopo.admin.ch/content/swisstopo-internet/de/topics/geoinformation/landscape-memory/longterm-conservation/geo-archive/_jcr_content/contentPar/tabs/items/dokumente/tabPar/downloadlist/downloadItems/236_1456926912698.download/konzeptberichtellipsev1.3publikationde.pdf (in German)
[8] http://www.eurosdr.net/research/project/eurosdr-archiving-working-group
[9] http://www.eurosdr-ireland.net/archiving/GI+100%20-%2016%20EuroSDR%20Archiving%20Principles_V3%201.pdf
[10] see e.g.: https://www.schweizerbart.de/papers/pfg/detail/2015/85386/Development_of_an_ISO_Standard_for_the_Preservation_of_Geospatial_Data_and_Metadata_ISO_19165
[11] http://www.isotc211.org/pow.htm - Project no. 19165
[12] Digital archiving policy, 2009, https://www.bar.admin.ch/dam/bar/de/dokumente/konzepte_und_weisungen/policy_digitale_archivierung.pdf.download.pdf/policy_digitale_archivierung.pdf (in German)

- decoupling of the data from specific IT environments (applications, database and operating systems, hardware)
- open, standardised environments that are as generic as possible
- homogenous storage infrastructure
- reduction of the number of file formats to a few that are archivable
- migration processes (in particular format conversions).

The SFA's principles for archiving digital documents also apply to geodata.

Digital archiving at the SFA is based on the OAIS reference model[13] (see Figure 2).

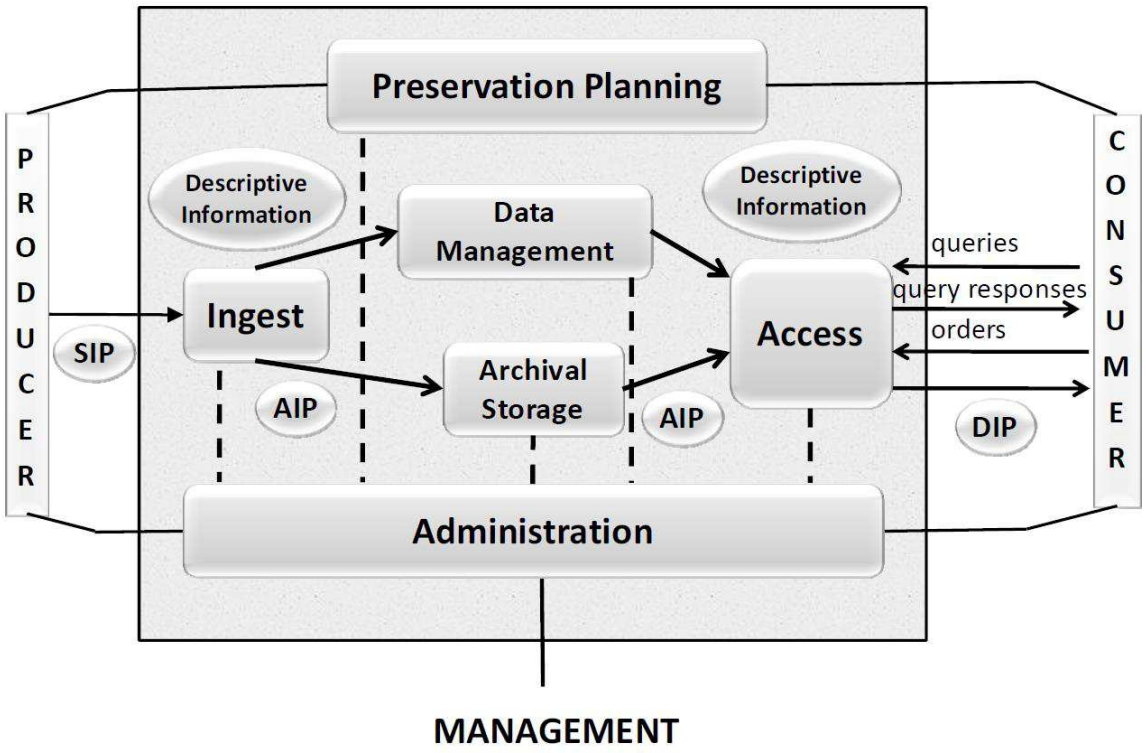


Figure 2: OAIS reference model – functional units

OAIS is a generic reference model for the SFA in the entire digital archiving environment, and is used as a directive for implementing a model suited to the situation and specific requirements of the SFA. All digital archiving systems and processes at the SFA are based on this model. The geodata archiving concept was also based on this model.

2.3.2 Principles for the archiving of federal geodata

This handbook lays down the following principles:

- Based on the geoinformation legislation[14], availability is ensured within the framework of **cooperation** between geodata producers (GCG) in the federal administration and the SFA.
- The **SFA** are a **partner** of (institution) **and contributor to** (archived official geodata under federal legislation) the **Federal Spatial Data Infrastructure (FSDI)**. The SFA are therefore members of the coordinating agency for federal geographical information (GCG)[15] where they in particular represent

[13] Open Archival Information System, ISO standard 147121:2012
[14] Long-term availability, Art. 14 GeoIO; Archiving, Art. 15 GeoIO.
[15] "The coordination of geographical information within the Federal Administration is under the strategic direction and management of the coordinating agency for federal geographical information, GCG". http://www.geo.admin.ch/internet/geoportal/en/home/geoadmin/organisation.html "The tasks of the coordinating agency are as follows: a. coordinating the activities of the federal administration; b. developing federal strategies; c. participating in the development of technical standards; d. operating a centre of competence; e. advising cantonal authorities." From: Internal

the archive perspective. Additionally, the SFA are permitted to use the same services[16] of the *Coordination, Geo-Information and Services Division* (COGIS) as other federal authorities.

- The aim of archiving geodata deemed to be of archival value is to document the business practice of the authority responsible but also, and especially, to create **time series and spatial monitoring tasks** (e.g. analysis of changes and developments to landscapes and settlements) over time.
- **Redundant data retention** in long-term availability and archiving at the SFA is to be **avoided**. This is to prevent duplication of infrastructures, reduce costs and deliberately coordinate the task at hand.

2.4 Metadata

Metadata are key information in the long-term conservation of data. Like formats, they play an important role throughout the path described above, from submission to the archive, in the archive itself, through to supplying from the archive to users.
For the purposes of the concept for archiving geodata, a distinction is made between various types of metadata:

- **Geospatial metadata:** Geospatial metadata are governed by Standard SN 612050 (2005-05 edition, Cadastral Surveying and Geoinformation – GM03 Metadata Model – a Swiss Metadata Model for Geodata).[17] Based on this standard, Switzerland offers a recording and search portal (geocat.ch) as well as a catalogue service for geospatial metadata. Geospatial metadata recording is the task of the authorities responsible (geodata producers). Geospatial metadata are submitted for archiving together with the geodata.
  As part of conservation and archiving planning, planning metadata has been recorded, e.g. the conservation period in long-term availability and the appraisal for archival value including justification. These planning metadata are integrated in the geospatial metadata (GM03/geocat.ch).
- **Archival metadata:** For archival metadata from digital submissions, the data dictionary of the SIP specification as well as the rules for the description of analogue documents apply. Both sets of rules are based on international standards, including the ISAD(G) standard[18], which governs archival description. The recording of archival metadata for delivery to the SFA is the task of the authorities responsible. Archival metadata are taken from the available geospatial metadata upon submission by the submitting authority and further information is added by the SFA. The SFA describe data in their archive information system (AIS) in accordance with the international archival standards. These enable archived documents to be managed and looked up.

3 Conservation and archiving planning (CAP)

The first CAP was conducted as part of the realisation of Project Ellipse. This involved defining the conservation periods for long-term availability and appraising the geodata for archival value once for the entire collection of geodata. The CAP was conducted jointly by the authorities responsible and the SFA. The precise procedure and the progress reports were set out in the federal CAP implementation report[19].

Upon completion of the project, the CAP will be updated annually in accordance with the federal CAP updating process described below.

3.1 Federal CAP updating process

Within the federal CAP updating process, the authorities responsible have the opportunity to report updates to the CAP once a year. This means that, for example, new geodata sets can be included in the planning, or information and appraisals of existing data sets can be updated. In the updating process,

regulations of the GCG, 29 October 2008, www.geo.admin.ch/internet/geoportal/de/home/geoadmin/organisation.parsysrelated1.7725.downloadList.18559.DownloadFile.tmp/reglementgkg20081029d.pdf (in German)

[16] "The Division acts as a specialist geoinformation service, in particular for the federal authorities. On the basis of geoinformation law it offers, in particular, advice and support in cross-disciplinary and super-disciplinary matters." (Complete list of the tasks of COGIS in the Regulations of the coordinating agency for federal geographical information dated 29 October 2008, Art. 14 Tasks of the Division, in German).

[17] GM03 as per SNV standard: http://www.geocat.ch/internet/geocat/en/home/documentation/gm03.html

[18] International Standard Archival Description (General); International application standard for describing archival documents.

[19] https://www.geo.admin.ch/content/geo-internet/de/geo-information-switzerland/archive-planning-information/_jcr_content/contentPar/downloadlist/downloadItems/386_1457616974073.download/Umsetzungsbericht%20AAP%20Bund%20V1.3_2016-04-14.pdf (in German).

other geodata-producing federal authorities have the opportunity to influence the appraisal. In each case, the SFA evaluate the archival value from a historical and social perspective.

COGIS takes responsibility for coordinating the updating process. The result at the end of the year (the adjusted and consolidated CAP) is stored and published in the metadata sets of the respective geodata sets in geocat.ch. The process over the course of the year (reporting and modifying changes, reporting new data sets etc.) is managed outside geocat.ch and is also coordinated by COGIS.

This chapter focuses on describing the updating process in the form of BPMN diagrams, consisting of the:

- superordinate “Federal CAP updating process”;
- sub-process “Update CAP (LA and A l+a)”;
- sub-process “Update CAP (A h+s and appraisal decision)”;
- sub-process “Publish CAP”.

A more detailed written description and commentary will also be provided for the process steps shown in the BPMN diagrams to aid understanding. The process descriptions indicate in particular who is responsible for what process and who is involved. The descriptions also contain details on the time sequence and the frequency with which the process is carried out.

3.1.1 Overview of the schedule of the annual federal CAP updating process

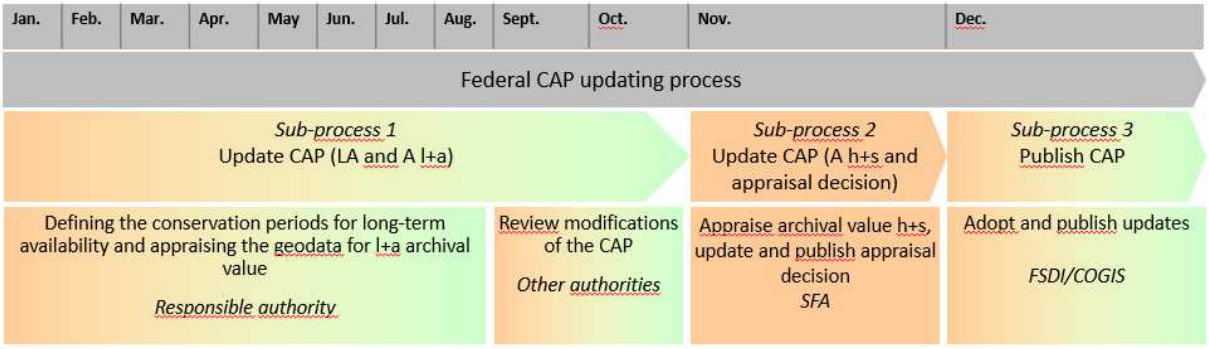


Figure 3: Overview of the schedule of the updating process and the sub-processes

3.1.2 Federal CAP updating process – superordinate process

3.1.2.1 BPMN process diagram

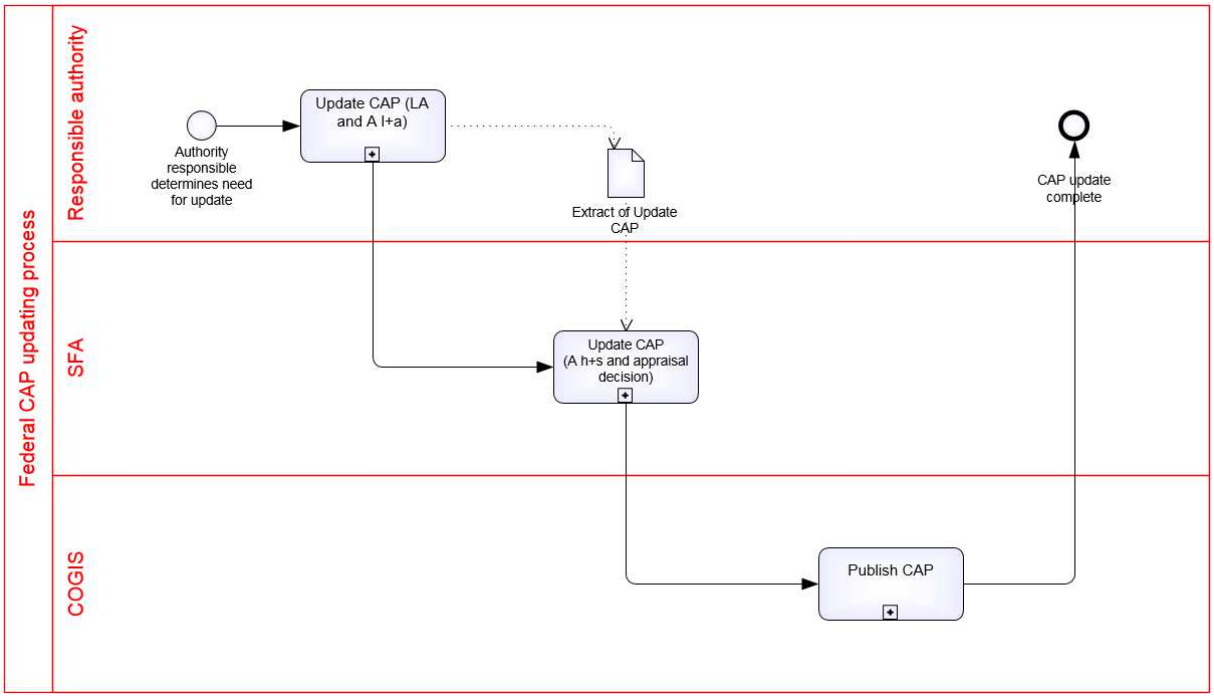


Figure 4: Federal CAP updating process

3.1.2.2 Process description

[A1] *Authority responsible determines the need for CAP update* (authorities responsible)

The process is triggered if the authority responsible for the geodata set determines that an update to the CAP is necessary. This may also occur when a new geodata set is created.

[A2] *Update CAP (LA and A l+a)* (authorities responsible)

This sub-process comprises the CAP being updated by the authority responsible and this being checked by the other authorities[20]. The updates include the conservation period in LA and the archival value according to legal and administrative criteria (A l+a).

[A3] Update CAP (A h+s and appraisal decision) (SFA)

This sub-process comprises the CAP being updated and this being checked by the SFA. The updates include the archival value according to historical and social criteria (A h+s). The appraisal decision is then updated and published.

[A4] *Publish CAP* (COGIS)

This sub-process comprises the changes being incorporated, the updated CAP being published by COGIS and the authorities responsible being informed.

[A5] *CAP update complete* (authorities responsible)

The superordinate process ends with the event “CAP update complete”.

[20] *Other authorities* mean all federal *authorities responsible* in accordance with Art. 8 para. 1 GeoIA that create, manage and edit geodata themselves and potentially rely on the geodata sets in question.

3.1.3 Sub-process “Update CAP (LA and A l+a)”

3.1.3.1 BPMN process diagram

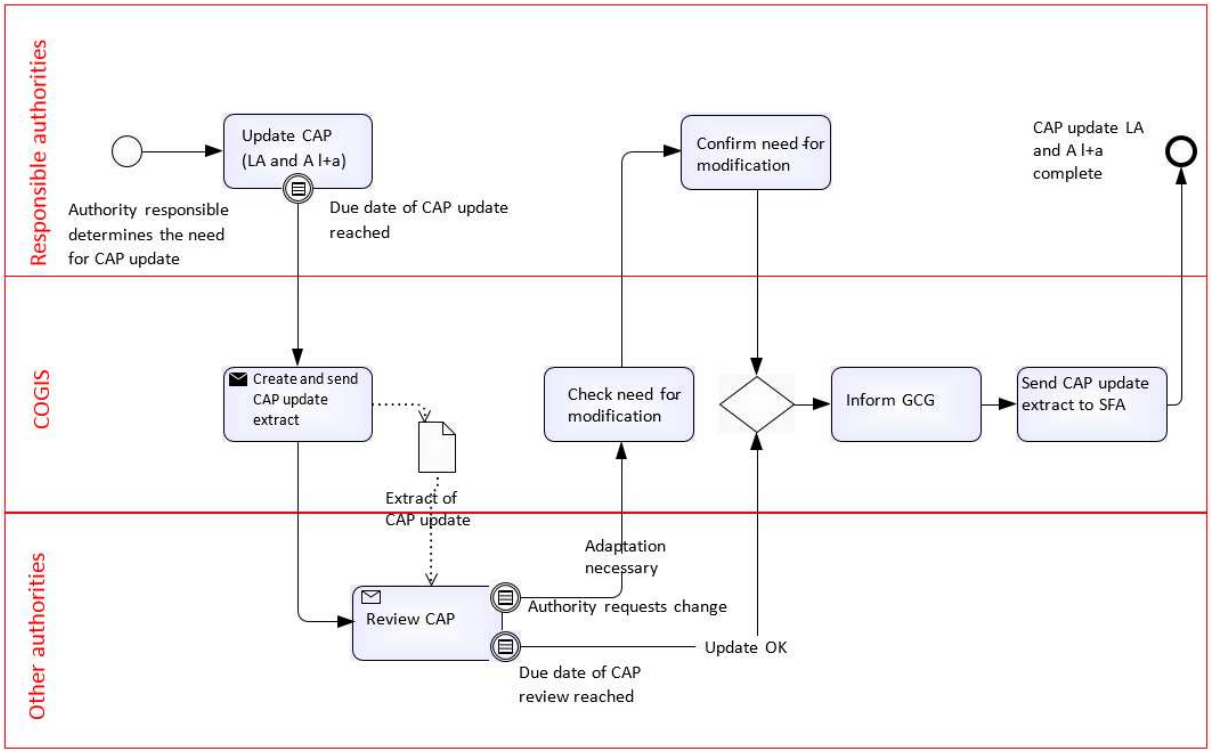


Figure 5: Sub-process “Update CAP (LA and A l+a)”

3.1.3.2 Process description

[B1] *Authority responsible determines the need for CAP update*

The sub-process is triggered if the authority responsible for the geodata set determines that an update to the CAP is necessary. This covers the following areas:

- Conservation period in LA
- Appraisal of archival value

The start event “Authority responsible determines the need for CAP update” can occur if, for example, the authority responsible wants to change the conservation period owing to a change in requirements or framework conditions, or has a different assessment of the archival value. The case “AR determines the need for CAP update” can also occur when a new geodata set is created, as this also concerns a change, more specifically the initial recording of the metadata of a geodata set including the CAP metadata.

[B2] *Update CAP (LA and A l+a)* (authorities responsible)

The authority responsible can modify the CAP-related metadata of a geodata set as required. This includes the conservation period in LA and the archival value according to legal and administrative criteria (A l+a) from the perspective of the authority responsible. These modifications can be made as required on an ongoing basis up until the end of August every year. From September, the changes are sent to all authorities responsible, other authorities and the SFA for checking and appraisal. During this period, the authorities responsible cannot record any new changes.

[B3] *Due date of CAP update reached*
The checking of the updates to the CAP by all authorities responsible and other authorities starts with the condition “Deadline for CAP update reached”, which is the case at the end of August every year.

[B4] *Create and send CAP update extract* (COGIS)
After the deadline has been reached, COGIS sends the CAP updates to the other authorities. They can then check what has been changed in the year in question.

[B5] *Review CAP* (other authorities)
Using a list with which the CAP-related changes can be tracked, the other federal authorities can check the CAP. This check is performed once a year. The aim here is to enable other authorities to have an influence on the conservation period in LA or on the appraisal of archival value, if they rely on the geodata set in question or if dependencies exist (in particular in the case of geospatial reference data).

[B5.1] *Check need for modification* (COGIS)
If the check reveals that modifications are required by the other authorities, these proposed changes are returned to COGIS.

[B5.2] *Confirm need for modification* (authorities responsible)
COGIS reports the need for modifications to the authority responsible, which confirms whether the changes are acceptable.

[B6] *Inform GCG* (COGIS)
If there is no need for modifications (update OK) and the condition “Deadline for CAP checking reached” has been met, or there was a need for modifications, the CAP was revised and the revision has been checked, then COGIS informs the GCG that the CAP has been updated. These activities must be completed by the end of October of each year.

[B7] *Send CAP update extract to SFA* (COGIS)
After the GCG is informed, COGIS sends the adjusted extract of the CAP with the updates to the SFA.

[B8] *CAP update LA and A I+a complete*
The sub-process ends with the event “CAP update LA and A I+a complete”.

3.1.4 Sub-process “Update CAP (A h+s and appraisal decision)”

3.1.4.1 BPMN process diagram

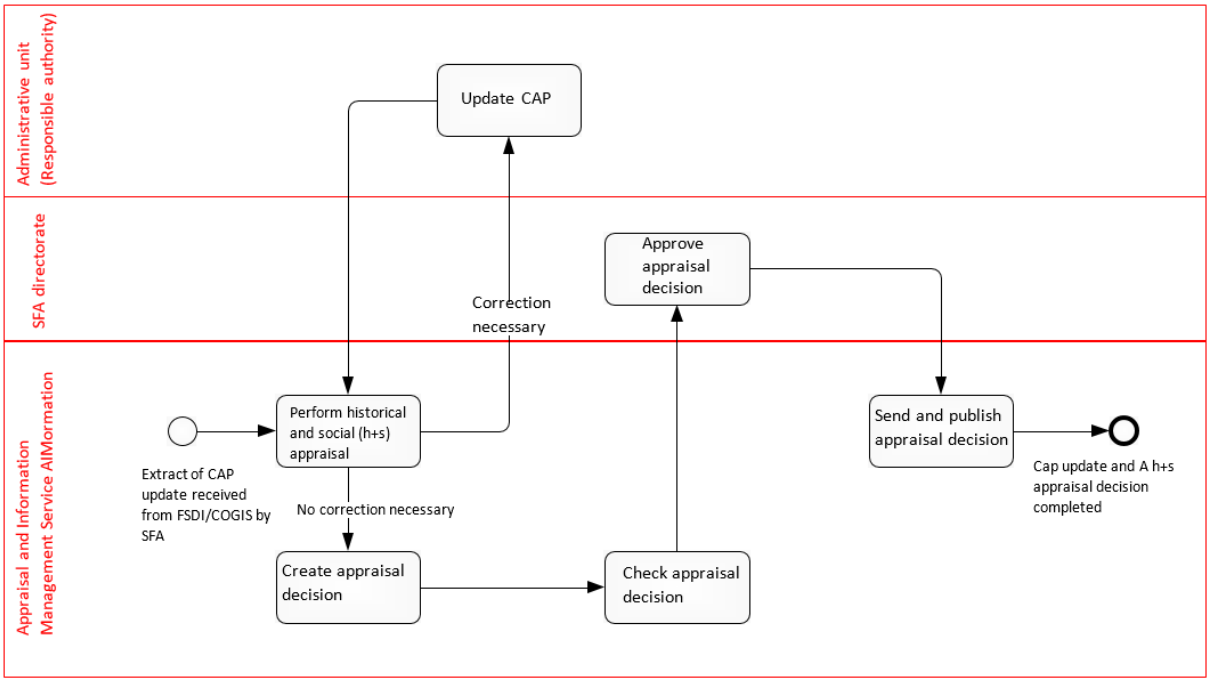


Figure 6: Sub-process “Update CAP (A h+s and appraisal decision)”

3.1.4.2 Process description:

[C1] *SFA receive extract of CAP updates from COGIS*

The sub-process begins with the event “SFA receive extract of CAP updates from COGIS”.

[C2] *Perform historical/social appraisal* (SFA/DBI)

Once the updated CAP extract, which has been appraised according to l+a, has been submitted to the SFA, the updates are checked. The SFA then evaluate the geodata based on the CAP extract from a historical and social (h+s) perspective.

[C3] *Update CAP (authority responsible)*

If there are any questions, the SFA consult the authority responsible.

[C4] *Create appraisal decision* (SFA/DBI)

The SFA update the existing appraisal decision for the geodata.

[C5] *Check appraisal decision* (SFA/DBI)

The SFA check the appraisal decision created for the geodata.

[C6] *Approve appraisal decision* (SFA directorate)

The appraisal decision is approved by the SFA directorate.

[C7] *Send and publish appraisal decision* (SFA)

The SFA inform COGIS of the appraisal decision approved by the SFA directorate and publish this on the SFA website.

[C8] *CAP update A h+s and appraisal decision completed*

The sub-process ends with the event “CAP update A h+s and appraisal decision completed”.

3.1.5 Sub-process “Publish CAP”

3.1.5.1 BPMN process diagram

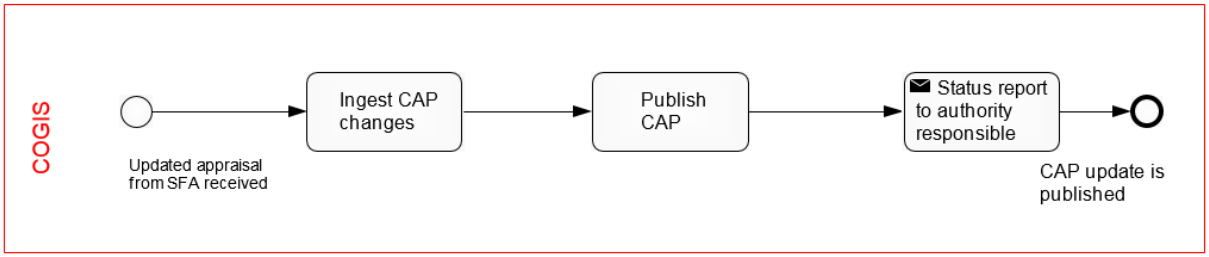


Figure 7: Sub-process “Publish CAP”

3.1.5.2 Process description

[D1] *Updated SFA appraisal decision received*

The sub-process starts with the event “Updated SFA appraisal decision received”.

[D2] *Ingest CAP changes* (COGIS)

COGIS adopts the changes made by the authorities responsible, other authorities and the SFA and updates the CAP.

[D3] *Publish CAP* (COGIS)

After the changes to the CAP have been adopted, COGIS publishes the updated CAP on geo.admin.ch.

[D4] *Status report to authority responsible* (COGIS)

COGIS then informs the authorities responsible that the CAP update and publication is complete.

[D5] *CAP update is published*

The sub-process ends with the event “CAP update is published”, as does the superordinate process “Federal CAP updating process”.

4 Ingest

Geodata are submitted by the authority responsible or on the latter’s behalf by COGIS, if the geodata are made available in the long term in the FSDI.
Here, the principle applies that each administrative unit only submits that geodata for which it is responsible.[21] There are exceptions, e.g. where the thematic geodata can no longer be technically separated from the geospatial reference data.
This means that geospatial reference data are not normally contained in the same submission as the thematic geodata, but are submitted separately. This procedure prevents the redundant transfer of reference data and permits compliance with the provenance principle (description of all documents in the context of the authority producing the record).
The digital documents that are submitted in the form of information packages to the SFA, where they are archived and made available again, always consist of primary data and metadata. Primary data

[21] Authority responsible according to the Catalogue of official data under federal legislation (SR 510.62, Appendix 1).

are data that are created directly by each records creator in association with the corresponding (official) competencies. In contrast, archival metadata are “information about the primary data”; they describe the primary data in more detail. Packing the primary data and metadata in the same data package significantly increases the information content of the individual data packages, as the documents contain their own descriptive context. In this process, it is always ensured that the information needed to understand the primary data, such as data models, handbooks, value tables or screenshots, are also provided. This enables the documents to be understood and interpreted without needing information from an archive system.

4.1 Submission interface Geo-SIP

The SFA publish the specification for the submission object Submission Information Package (SIP)[22]. This specification currently applies regardless of whether the contents concern the submission of geodata, other data or a combination of the two.
Submissions are divided into dossiers (business cases). One submission can contain one or more dossiers. All files in a dossier must be available in archivable file formats.

4.2 Closure periods

The Federal Archiving Act (ArchA) and the Freedom of Information Act regulate access to the documents of the federal archives. Among other things, the SFA define closure periods[23] for documents. Up until this expires, the documents may only be consulted with prior authorisation. Afterwards, they are freely accessible free of charge. Closure periods are defined by the submitting authority and are recorded as a metadatum when a SIP is created.
For official geodata, the closure period can, to a partial extent, be derived from the access authorisation level as per the appendix to GeoIO:

- Access authorisation level “A” results in closure period 9.2 according to Art. 9 ArchA.
- For access authorisation level “B”, the closure period categories 9.1 according to Art. 9 ArchA or 12.1 according to Art. 12.1 ArchA are most likely concerned.
- For access authorisation level “C”, the closure period 12.1 according to Art. 12.1 ArchA is most likely concerned.

4.3 Geo-dossier

An ordered folder structure is prescribed for geodata. Its aims are, firstly, to take into account the multi-dimensional characteristics (time, layer, space) of geoinformation, secondly, to make it easy for both humans and machines to interpret the structure, and thirdly, to facilitate future understanding of the geoinformation on the basis of the prescribed uniformity.
If the contents of a dossier are geodata, they must be specially classified. A geo-dossier contains the primary data and metadata of a snapshot of a geodata set. Details on the structural requirements can be found in the document “Geo-SIP and geo-dossier specification”[24].

4.4 Archivable geoformats

In long-term availability, current, up-to-date and often manufacturer-/GIS-specific file formats are used. In the archive, digital data are stored exclusively in archivable formats. Archivable formats are distinguished by the fact that they are widespread and stable in the long term, they are not limited by licences, their documentation is freely available and multiple independent programs exist for using these formats. These properties enable data to be stored and used over very long periods.
The SFA have already defined archivable formats for text data, general image data, audio and video data and for databases. In Project Ellipse, further archivable formats have been defined for geodata:

[22] https://www.bar.admin.ch/bar/de/home/archivierung/ablieferung/digitale-unterlagen.html (in German)
[23] https://www.bar.admin.ch/bar/en/home/research/ordering-and-consulting/requests-to-consult-records.html#-670559322
[24] [Link to Geo-SIP and geo-dossier specification]

Format name	Used for							Endings	PRONOM PUID	Documentation
	Vector data	Image and graphic raster data	Thematic raster data	Height data	Geospatial metadata	Minimum geodata models	Other documentation			
TIFF+EWF.XML		X	X[1]	X[4]				.tif .tiff .xml	open	Information sheet “Archivable raster format for geodata TIFF+EWF.XML”[25]
INTERLIS 2.3 Transfer File	X		X[2]	X[5]				.xtf .xml	fmt/653	INTERLIS 2.3 Reference Manual (eCH-0031; SN 612 031)[26]
INTERLIS 2.2 Transfer File	X		X[2]	X[5]				.xtf .xml	fmt/653	INTERLIS 2.2 Reference Manual (former SN 612 031)[27]
INTERLIS 1 Transfer File	X		X[2]	X[5]				.itf	open	INTERLIS 1 Reference Manual (SN 612 030)[28]
INTERLIS 2.3 Model File						X		.ili	fmt/654	INTERLIS 2.3 Reference Manual (eCH-0031; SN 612 031) see 27
INTERLIS 2.2 Model File						X		.ili	open	INTERLIS 2.2 Reference Manual (former SN 612 031) see 28
INTERLIS 1 Model File						X		.ili	open	INTERLIS 1 Reference Manual (SN 612 030) see 29
XML (Extensible Markup Language)					X			.xml	fmt/101	Cadastral Surveying and Geoinformation – GM03 Metadata Model – a Swiss Metadata Model for Geodata SN 612 050)[29]
SIARD (Software-Independent Archival of Relational Databases)			X[3]					.siard	fmt/161	SIARD format specification (eCH-0165)[30]
CSV (Comma Separated Values)			X[3]					.csv	x-fmt/18	
Acrobat PDF/A (1b)							X	.pdf	fmt/354	

[2] if available as points (vector data)
[3] if available as a table (x, y, attribute)
[4] for height raster data
[5] for break lines and height points

Note: When submitting a geodata set, the format versions of the INTERLIS transfer file and the associated INTERLIS model must match

Table 1: Archivable geoformats (last updated 31/12/2016)

The current and binding list of archivable formats is managed by the SFA and is revised and supplemented on an ongoing basis[31].

[25] SFA information sheet “Archivable raster format for geodata TIFF+EWF.XML” https://www.bar.admin.ch/bar/en/home/archiving/digital-documents/archiving-of-geodata.html
[26] INTERLIS 2.3 Reference Manual https://www.interlis.ch/interlis2/docs23/ili2-refman_2006-04-13_e.pdf
[27] INTERLIS 2.2 Reference Manual https://www.interlis.ch/interlis2/docs22/ili2-refman_2003-05-13_e.pdf
[28] INTERLIS 1 Reference Manual https://www.interlis.ch/interlis1/docs/Iref_11_e.pdf
[29] GM03 – Metadata Model (as per SNV standard) https://www.geocat.admin.ch/content/geocat-internet/de/documentation/gm03-metadata-model/_jcr_content/contentPar/downloadlist_1285307400/downloadItems/681_1464342603293.download/gm03v23de.pdf (in German)
[30] SIARD format specification http://www.ech.ch/vechweb/page?p=dossier&documentNumber=eCH-0165&documentVersion=1.0 (in German)
[31] SFA list of archivable formats https://www.bar.admin.ch/bar/de/home/archivierung/ablieferung/digitale-unterlagen.html (in German)

4.5 Submission processes

This chapter describes the submission processes in two variants in the form of BPMN diagrams and as text.

4.5.1 Submission from the FSDI

This submission variant is used if the LA takes place in the FSDI and geodata are submitted from there to the SFA.

4.5.1.1 BPMN process diagram

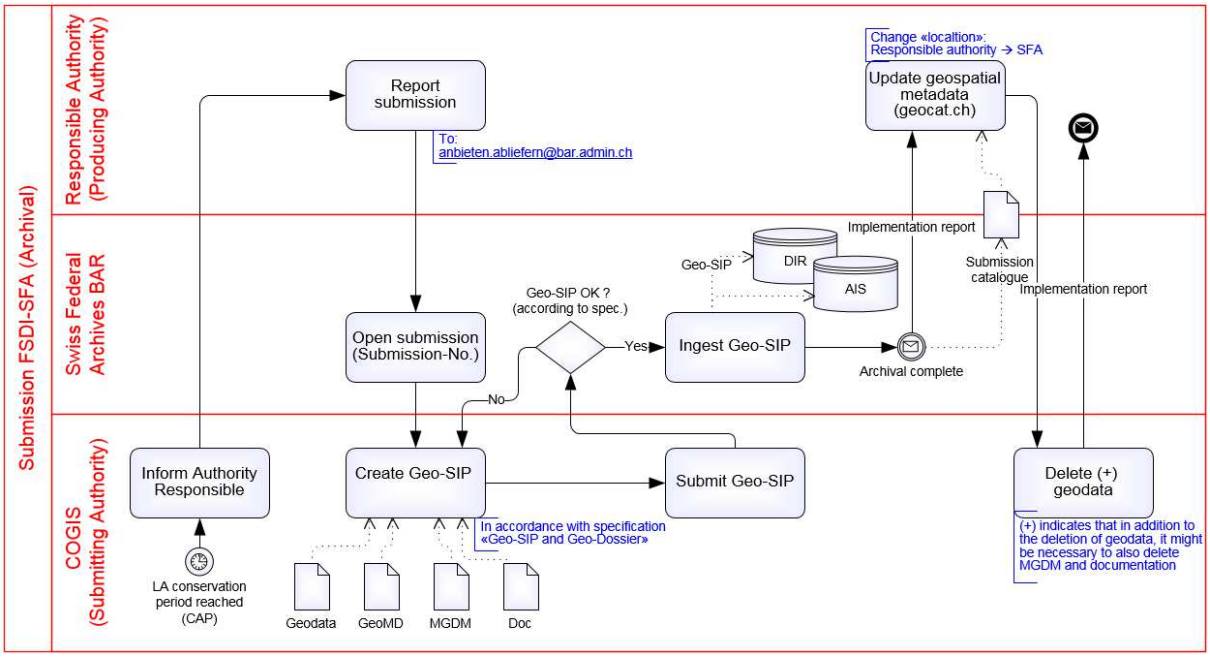


Figure 8: FSDI-SFA submission process (archiving)

4.5.1.2 Process description

[E1] *LA conservation period reached* (COGIS)

In the CAP, the conservation period in LA is recorded for every geodata set.
Within the context of the federal CAP updating process, the CAP coordination centre controls the conservation periods in LA that are due to expire. In the federal CAP updating process, this reminder is triggered once a year in accordance with the CAP schedule. Normally, this is the start of the year for outstanding submissions from the previous year, if the CAP updating process for the previous year – including appraisal by the SFA – is complete.

[E2] *Inform authority responsible* (COGIS)

If a geodata set for archiving has been detected in the FSDI during the CAP updating process, the CAP coordination centre informs the authority responsible that the conservation period in LA has expired and the geodata set is due for archiving.
E.g.: “Geodata set xy.z is due for archiving according to the CAP. Please report its submission to the SFA via anbieten.abliefern@bar.admin.ch.”

[E3] *Report submission* (authority responsible)

The authority responsible reports the geodata set to the SFA for archiving via one of the following email addresses: anbieten.abliefern@bar.admin.ch (SPOC of the SFA).

[E4] *Open submission* (SFA)

The SFA open the submission (in accordance with their internal process) and inform COGIS of the associated submission number.
The method of distributing submissions over the year is determined in coordination with the CAP in January, on the basis of the quantities due for the coming year.
If large quantities of submissions are due, the SFA will propose specific submission dates if necessary, in order to distribute the workload over the year for CAP staff.

[E5] *Create Geo-SIP* (COGIS)

COGIS creates the Geo-SIP in accordance with the specification. The following data are integrated in the Geo-SIP:

- Geodata
- Geospatial metadata (as export from geocat.ch)
- Minimum geodata model(s)
- Documentation
- Preview (preview image)

[E6] *Submit Geo-SIP* (COGIS)

COGIS submits the Geo-SIP via the SFA transfer platform (web interface, REST interface). To begin with, no provisions are made for automation. The initial submissions are made manually by COGIS. This enables the existing potential for automation to be identified. If need be, the existing SFA package handler for the submission of geodata (Geo-SIP) is modified or a dedicated application is developed.

[E7] *Ingest Geo-SIP* (SFA)

The SFA take in the submitted Geo-SIP. It is then checked in accordance with the SFA's internal process (correctness, completeness etc.).
If the incoming check reveals errors, COGIS is informed of these errors and any missing documents are reported. COGIS revises/supplements the Geo-SIP [E5] and redelivers it [E6].
Once the SFA have determined that the Geo-SIP is correct and complete, it is transferred to the Digital Information Repository (DIR) as an Archival Information Package (AIP) in accordance with the SFA's internal process. The archival metadata are then created and the submitted dossiers are described in the AIS.
The SFA submit an implementation report to the authority responsible and deliver a submission list.

[E8] *Update geospatial metadata* (authority responsible)

Once the authority responsible has been informed by the SFA that the submitted geodata set has been archived successfully, it updates the geospatial metadata entry in geocat.ch.
Once the geospatial metadata entry in geocat.ch has been updated, the authority responsible reports that the geodata set (including any associated geodata models and documentation) can be deleted in the FSDI.

[E9] *Delete geodata* (COGIS)

COGIS deletes the geodata set (and any associated geodata models and documentation) from the FSDI systems in accordance with the specifications of the authority responsible.
The (updated) entry in geocat.ch is retained. The authority responsible retains responsibility for the metadata entry in geocat.ch.
Once deletion is complete, the authority responsible receives an implementation report from COGIS.
The FSDI – SFA submission process is then complete.

4.5.2 Direct submission by the authority responsible

This submission variant is used if LA takes place within the scope of the authority responsible and the latter directly submits the geodata to the archive.

4.5.2.1 BPMN process diagram

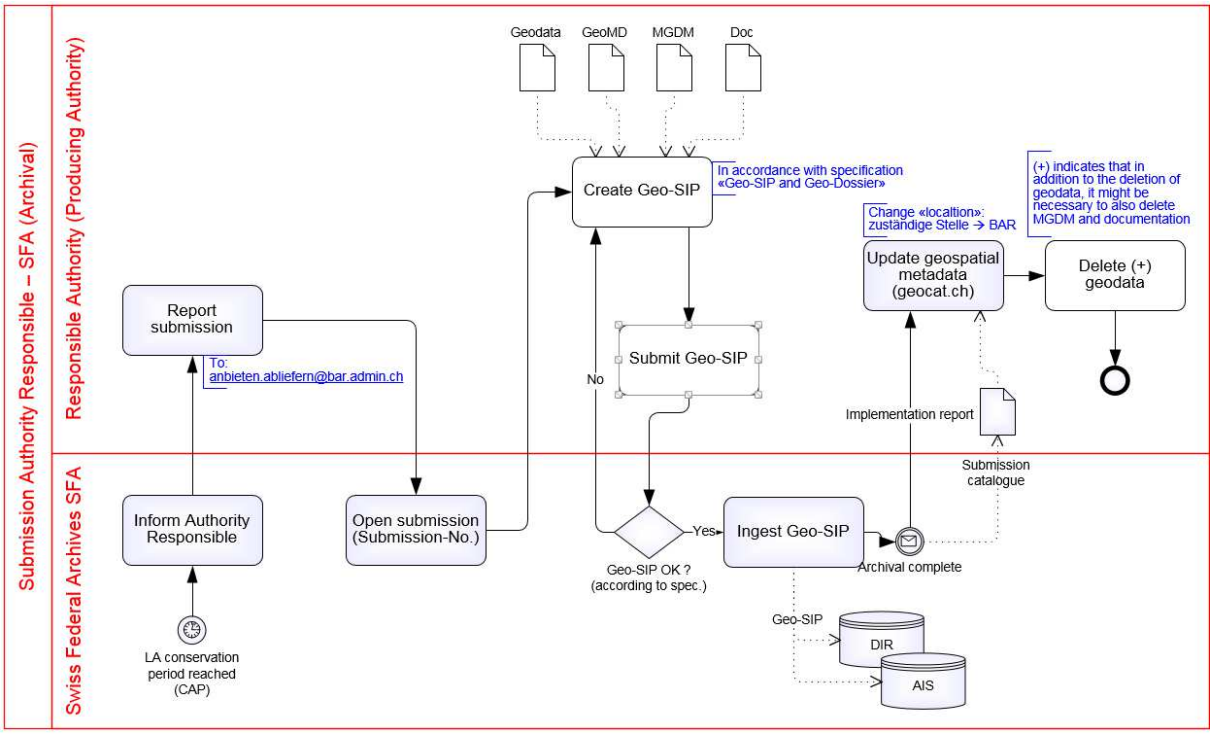


Figure 9: Authority responsible – SFA submission process (archiving)

4.5.2.2 Process description:

[F1] *LA conservation period reached* (SFA)

In the CAP, the conservation period in LA is recorded for every geodata set. The SFA control the conservation periods in LA that are due to expire. If a responsible authority does not keep its geodata in long-term availability in the FSDI, but on its own systems, the SFA controlling process identifies when a geodata set is due for archiving.
In the SFA controlling process, this reminder is triggered once a year in accordance with the CAP schedule.

[F2] *Inform authority responsible* (SFA)

If the SFA controlling process detects a geodata set for archiving, the authority responsible is informed via email that the conservation period in LA has expired and the geodata set is due for archiving.
Example of the notification: “Geodata set xy.z is due for archiving according to the CAP. Please report its submission to the SFA via anbieten.abliefern@bar.admin.ch.”

[F3] *Report submission* (authority responsible)

The authority responsible reports the geodata set to the SFA for archiving via one of the following email addresses: anbieten.abliefern@bar.admin.ch (SPOC of the SFA).

[F4] *Open submission (SFA)*

The SFA open the submission (in accordance with their internal process) and inform the authority responsible of the associated submission number.
The method of distributing submissions over the year is determined in coordination with the CAP updating process in January, on the basis of the quantities due for the coming year.
If large quantities of submissions are due, the SFA will propose specific submission dates if necessary, in order to distribute the workload over the year for CAP staff.

[F5] *Create Geo-SIP* (authority responsible)

The authority responsible creates the Geo-SIP in accordance with the specification. The following data are integrated in the Geo-SIP:

- Geodata
- Geospatial metadata (as export from geocat.ch)
- Minimum geodata model(s)
- Documentation
- Preview (preview image)

[F6] *Submit Geo-SIP* (authority responsible)

The authority responsible submits the Geo-SIP via the SFA transfer platform (web interface).

[F7] *Ingest Geo-SIP* (SFA)

The SFA take in the submitted Geo-SIP. It is then checked in accordance with the SFA's internal process (correctness, completeness etc.).
If the incoming check reveals errors, the authority responsible is informed of these errors and any missing documents are reported. The authority responsible revises/supplements the Geo-SIP [F5] and redelivers it [F6].
Once the SFA have determined that the Geo-SIP is correct and complete, it is transferred to the DIR as an AIP in accordance with the SFA's internal process. The archival metadata are then created and the submitted dossiers are described in the AIS.
The SFA submit an implementation report to the authority responsible and deliver a submission list.

[F8] *Update geospatial metadata* (authority responsible)

Once the authority responsible has been informed by the SFA that the submitted geodata set has been archived successfully, it updates the geospatial metadata entry in geocat.ch.

[F9] *Delete geodata* (authority responsible)

The authority responsible deletes the geodata set (and any associated geodata models and documentation) from its LA systems. The (updated) entry in geocat.ch is retained. The authority responsible retains responsibility for the metadata entry in geocat.ch.
The authority responsible – SFA submission process is then complete.

5 Preservation

5.1 Principles

The overriding goal of digital preservation is to ensure a level of information and the quality thereof such that the information remains usable over a long period of time. The SFA take this objective into account on two levels when archiving digital data. Firstly, they preserve the substance of the digital documents: this means that the files remain preserved at the "bit stream" level (storage). Secondly, through archival description and through preservation of the information in suitable formats, the SFA ensure that the digital documents and their context remain in a form that can be presented and interpreted.

The SFA's archiving strategy is based on the migration principle. In accordance with this principle, digital documents are preserved in formats that are adapted in line with the changing technical conditions. This ensures that the documents can continue to be used even under new conditions, and that the information contained in the documents remains preserved. The digital documents are converted into a new, archivable format if necessary.

5.2 Migration of file formats

If format migration is required, the SFA migrate the archive records. The SFA's archive system enables all the data that is to be migrated to be automatically identified, prepared for migration and reimported after migration. For the format migration itself, the SFA work with the specialist offices and with the GCG/COGIS.

The SFA ensure that no losses occur during conversion. The preservation process and any resulting changes to the archive records are always documented and can be retraced at any time. In the case of preservation measures at the document level, a new version of an AIP is always created in the SFA and is then marked as the current version. The original version of an AIP, which corresponds exactly to the submitted data, remains stored in the digital repository and can be identified there.

The basis for the planning of migration measures at the format level is the regular control of the communicability of the archive records. The suitability of a format as an archivable format can change, for example, if progressively fewer people have experience of such a format and only a few experts remain who can read it. A format migration is then advisable at this point at the very latest.

6 Access

Archived geodata are accessed via online search.[32] The archive records available online include both the metadata and primary data.

6.1 Metadata

The basis of the search for archived geodata is formed by a selection of archival metadata and geospatial metadata that were recorded in geocat.ch and transmitted in a SIP package when such a package is submitted to the SFA. Metadata are systematically recorded when geodata are managed (in geocat.ch). Missing metadata must be recorded at the latest before submission of the geodata to the SFA.
The geospatial metadata and archival metadata listed in the table below are stored in the AIS of the SFA within the context of geodata archiving and is made searchable for online access. They follow the SFA's principles for classifying fonds and supplement the SFA's principles of description.[33]

[32] https://www.swiss-archives.ch
[33] Principles for classifying fonds: First of all, the provenance principle applies within the sense of an authority as the records creator; secondly, the registry principle applies, where the registry – in other words the pre-archive folder system (registry plan) – is also understood to be part of the provenance. The federal archives' principles of description define the hierarchy and description of ingested documents (analogue and digital) within the archive tectonics.

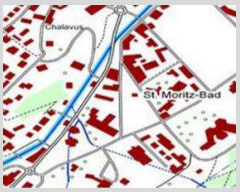
Art.	No.	Name	Mandatory	Level			Example
				SIP	Rubric (geodata set)[34]	Dossier (Snapshot)	
Geospatial metadata	1.1	Type	Yes	X			Geodata
	1.2	UUID metadata geocat.ch	Yes		X	X	d47dffc7-8072-40c2-bbf7-4fb47367bd29
	1.3	Official geodata set ID	No[35]		X	X	19.1
	1.4	Abstract	Yes		X	X	As natural habitats in the flood areas of bodies of water, wetlands are in decline. [...]
	1.5	Preview	Yes		X	X	
	1.6	UUID geospatial reference data	No		X	X	[UUID of national map 1:25,000 dated 1992.]
	1.7	Additional geospatial reference data	No			X	Recorded and revised on the basis of national map 1:25,000 (1992). Recommended reference data set: Pixel map 1:25,000
	1.8	Geocategory	Yes		X	X	L2 Nature and landscape protection
	1.9	Keywords	No		X	X	Environment Protected areas Habitats and biotopes
Archival metadata	2.1	Signature	Yes		X	X	E3363-09#2012/8#1*
	2.2	Submission number	Yes	X			2012/8
	2.3	Submitting authority	Yes	X			Federal Office for the Environment (FOEN)
	2.4	Producing authority	Yes	X			Federal Office for the Environment (FOEN)
	2.5	File reference	No		X	X	XY.123
	2.6	Rubric title	Yes		X		Federal inventory of wetland areas of national significance (wetland inventory)
	2.7	Snapshot title	Yes			X	Wetland areas as at 1992
	2.8	Snapshot time period	Yes			X	1992
	2.9	Closure period category	Yes			X	Art. 9.2 ArchA

Table 2: Metadata for archive searching

6.1.1 Search

Searching for geodata in the SFA is the same as searching for other data in an archive. All the geospatial metadata listed in Table 1 can be found via a full text or field search in the online search. A specific search can be conducted by entering the official geodata set ID in the field *File reference*.[36]

6.1.2 Geodata overview

In a manner similar to the fonds overview, which provides searchers with thematic access to archived data of the Confederation from 1848, an overview is also provided for geodata. Geodata sets are allocated based on the geospatial metadatum *Geocategory*.

6.2 Presentation

The hit display for geodata is the same as that for other data. However, the preview is also always displayed.

6.3 How users obtain geodata

In principle, the provision of archived geodata is handled in the same manner as the usual provision of digital data from the archive. However, the size of the data sets in particular can be a special feature of geodata. As a rule, freely accessible data can be obtained online. However, in certain cases provision in line with the usual processes may not be feasible and alternative forms of provision must be used (e.g. via hard disc or obtaining data on site).

6.4 Use and fees

In principle, geodata are kept either in long-term availability or in the archive; there is no legal provision for parallel data retention. The conditions of use of long-term availability or the SFA apply accordingly.

Access to archived geodata is, as is the case for other archive records too, free of charge in principle; fees may be charged for services that go beyond the basic provision.

In the exceptional case where geodata are held in both long-term availability and in the SFA, they are always supplied from long-term availability. In this case, the conditions of use and any fee regulations of long-term availability apply.

7 Revision and publication of the handbook

The handbook is checked jointly by the SFA and COGIS every year and is revised if necessary. The changes are approved by the GCG. It is published on the SFA website and on geo.admin.ch.

[34] The levels available for the description are “series” (as many as required), “dossier”, “subdossier” and “file”. The lowest level of the series is the “rubric”. The dossiers are attached to the rubric.
[35] The official geodata set ID is mandatory for official geodata. For all other geodata, this field is not filled in.
[36] The first geodata will be archived by the SFA in the course of 2017.