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Factsheet 5
Data management

Publication details

This factsheet explains the principles for the capture, quality control, submission and storage of data collected in the STANDARD and EXTENDED outcome evaluations. The use of data for cross-project analyses for the collaborative learning process is described in Factsheet 4.

5.1 Digital data capture

In addition to the determination of indicators in the field and assessment, digital data capture is also to be nationally standardised as far as possible. A standardised data base is essential for cross-project, centralised analysis, for the collaborative learning process and sharing of experience, and for secure long-term storage of all the data collected (data archive).

5.1.1 Data arising

For each of the ten predefined indicator sets, field protocols and data entry forms for standardised data capture are available on the FOEN website (www.bafu.admin.ch/outcome-evaluation-resto). These can be used for the STANDARD outcome evaluation. They are also to be used for the EXTENDED outcome evaluation (PA 2020–2024).

- *Field protocols:* These are available as pdf files, which can be printed out. They contain all the variables for the various indicators, as well as information on units and input ranges. The variables are assigned unique numbers. Field protocols can be completed by hand. Data recorded manually must subsequently be digitalised, i.e. input electronically into the entry form. Alternatively, data can be entered electronically directly in the field.
- *Data entry forms:* Depending on the indicator set, these comprise three or more worksheets. All the variables contained in the field protocol are to be entered, with the variable numbers permitting rapid matching of items between the field protocol and entry form. In the "DataDictionary" worksheet, all the variables are described, together with the corresponding unit, data type and value ranges; it thus serves as a reference resource. For data entry, wherever possible, drop-down lists are available, containing predefined entries and specified value ranges. As a result, data entry is facilitated, the risk of input errors (e.g. miskeying) is reduced, and data quality is improved. Missing values are indicated as NA.

In addition to the 10 predefined indicator sets, Indicator Set 11 allows project-specific characteristics to be taken into consideration, e.g. the determination of an indicator for dragonflies, amphibians or lichens. As no standardised methodological requirements exist, field protocols or data entry forms are not available. However, this data is also to be submitted to the FOEN (Fig. 5.1).

As well as the data entered in the entry form, additional data and information arises in certain indicator sets, e.g. photos or GIS files (see Table 5.1 below). This is indicated under the relevant variables in the entry form.

5.1.2 Responsibilities and requirements

Ideally, the data collected should be entered directly in the forms provided by the consultancy contracted to determine the indicator set in question. Data entry forms must not be individually adapted by users, since a standardised structure provides the basis for centralised data integration. Accordingly, certain cells in the entry forms are write-protected. Any difficulties arising with data entry should be reported immediately by e-mail to: wiko_revit@bafu.admin.ch. Prompt notification will ensure that the difficulty can be rapidly resolved and an updated version of the data entry form can be made available to users via the download page.

A data entry form is to be completed for each survey time point (before, after 1, after 2) and indicator set. The entry forms are assigned a specified name for storage and submission: KT_ProjektCode_ERHEBUNG_SetX_VersionsNr.xls; this file naming scheme (including use of upper- and lowercase characters) must be followed.

- "KT" stands for the two-capital-letter cantonal abbreviation (e.g. AI, BE, ZH).
- "ProCode" indicates the internal cantonal number/code assigned to the project. If a canton does not yet have a number of this kind, it is requested to create one. The project number is to be used consistently for the implementation and outcome evaluation.
- "ERHEBUNG" designates the survey time point and will read VORHER (= before), NACHHER1 (= after 1), NACHHER2 (= after 2), or VERTIEFT (= EXTENDED).

Thus, an entry form could, for example, have the following name: BE_201903_VORHER_Set7_V1.xls. The same naming scheme is also to be used for other data (e.g. photos, GIS files).

5.2 Data flow

To ensure that outcome evaluation can promote cross-project learning, all the data collected must be integrated in a centralised archive and jointly analysed. Below, it is explained what steps are required for complete, standardised data collection, and who is responsible for each step (Fig. 5.1).

Figure 5.1: Steps required for data management from collection to analysis, and the entities responsible for each step.
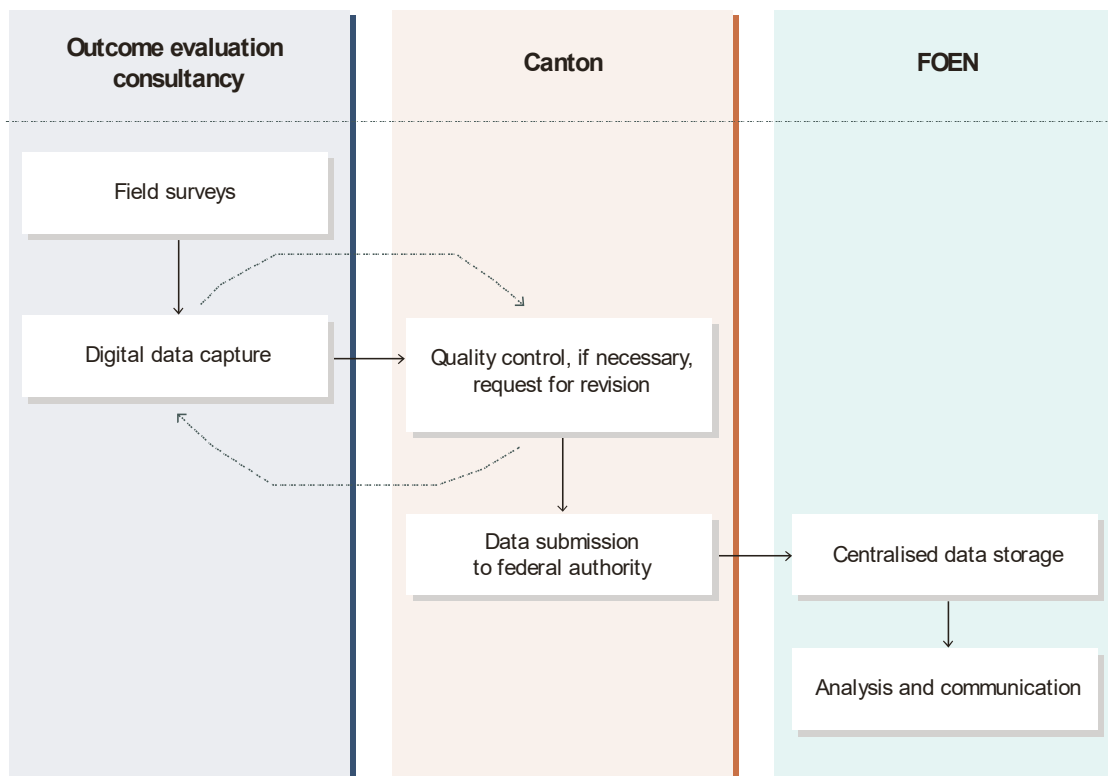
5.2.1 Quality control

Data entry forms are to be checked for completeness and correctness by the canton (or the commune or third party). It is to be ensured that:
- all necessary values are included (header data, indicator-set-specific data on determination and assessment),
- the project code for the outcome evaluation is identical to the corresponding cantonal project number for the implementation evaluation ("Kenndaten") and future field surveys associated with the outcome evaluation.

If any entries are missing or incorrect (e.g. wrong measurement unit, numbers in text fields, non-use of drop-down menus), the consultancy contracted for the outcome evaluation must be requested to make corrections if necessary. Only after this quality control is the data to be forwarded to the FOEN. On receipt of the data by the FOEN, an internal quality control is performed for completeness of entries.

5.2.2 Data submission

The various indicator sets for a single survey (e.g. "before" survey) may possibly be determined at different times. The data for all the indicator sets required for a single survey (e.g. "before" survey) should be collected by the canton and submitted to the FOEN en bloc, as soon as all the data is available and has undergone quality control. As well as the data entered in the entry form, a number of indicator set technical sheets call for additional information, e.g. photos or GIS files (Table 5.1). This information is to be submitted to the FOEN together with the entry forms. Project-specific survey data (e.g. Set 11 – Project-specific goal) is to be sent to the FOEN in the available format. Data submissions are to be made by e-mail to: wiko_revit@bafu.admin.ch.

Data collected using Modular Stepwise Procedure (MSP) methods (e.g. Indicator Sets 5 – Macrophytes, 6 – Macroinvertebrates, 7 – Fish) is also to be included in the macroinvertebrate database (MIDAT/MIDAT+) of the Swiss Centre for the Cartography of Fauna (CSCF/SZKF). Additional information will be provided in an updated version of this factsheet in 2020.

5.2.3 Centralised data storage

At the start of the STANDARD and EXTENDED outcome evaluation, data is transferred between the canton and the FOEN via entry forms. At the FOEN, the data is stored in a structured manner so that it can be used for centralised analysis.

Over the medium to long term, data from implementation and outcome evaluations is to be integrated into a "Restoration evaluation" data archive. This archive could be Web-based and thus accessible to authorised (federal, cantonal and, if appropriate, third-party) users. The data is to be used for cross-project analyses and should facilitate cross-project learning; additional project documentation (e.g. photos and maps) could optionally also be made accessible.

5.3 Data usage rights

The legal question of data usage rights is still under examination, and further information will be added to this factsheet in 2020. The cantons are free to pass on their own data to third parties and use it for communication purposes.

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Table 5.1: Data arising for each indicator set and specified file names. Templates can be found at: www.bafu.admin.ch/outcome-evaluation-resto
* For geodata please use coordinate system CH1903+ LV95.

Indicator set	Data arising and specified file names	Description
1. Habitat diversity	KT_ProCode_ERHEBUNG_Set1_V#.xls	Raw data and assessment of Set 1
	KT_ProCode_ERHEBUNG_Set1_Ind1_1.shp	River bed structures as polygon shapefile
	KT_ProCode_ERHEBUNG_Set1_Ind1_2.shp	River bank structures as line shapefile
	KT_ProCode_ERHEBUNG_Set1_Ind1_3_4.shp	Water depth and flow velocity along cross sections as point shapefile
	KT_ProCode_ERHEBUNG_Set1_Ind1_5.shp	Cover types as polygon shapefile
	KT_ProCode_ERHEBUNG_Set1_Ind1_6.shp	Substrate as polygon shapefile
	KT_ProCode_ERHEBUNG_Set1_1up jpeg KT_ProCode_ERHEBUNG_Set1_1down jpeg KT_ProCode_ERHEBUNG_Set1_2up jpeg KT_ProCode_ERHEBUNG_Set1_2down jpeg KT_ProCode_ERHEBUNG_Set1_3up jpeg KT_ProCode_ERHEBUNG_Set1_3down jpeg KT_ProCode_ERHEBUNG_Set1_4up jpeg KT_ProCode_ERHEBUNG_Set1_4down jpeg	Photos documenting restored section and subsection
	KT_ProCode_ERHEBUNG_Set1_air jpeg/ .tif/ .geotiff	If available, aerial/ drone-shot photograph (georeferenced) documenting the restored section
2. Dynamics	KT_ ProCode_ERHEBUNG_Set2_V#.xls	Raw data and assessment of Set 2
	KT_ProCode_ERHEBUNG_Set2_Ind2_1.shp	River bed structures at 5–10 years before restoration as polygon shapefile
	KT_ProCode_ERHEBUNG_Set2_Ind2_2.shp	River bank structures at 5–10 years before restoration as line shapefile
3. Connectivity	KT_ ProCode_ERHEBUNG_Set3_V#.xls	Raw data and assessment of Set 3
	KT_ProCode_ERHEBUNG_Set3_Ind3_1.shp	Floodable areas at HQ_2 as polygon shapefile
	KT_ProCode_ERHEBUNG_Set3_Ind3_2.shp	Shorelines at mid-flow as line shapefile
4. Temperature	KT_ ProCode_ERHEBUNG_Set4_V#.xls	Raw data and assessment of Set 4

Indicator set	Data arising and specified file names	Description
5. Macrophytes	KT_ProCode_ERHEBUNG_Set5_Output_Datastation.txt KT_ProCode_ERHEBUNG_Set5_Output_Taxa_used.txt KT_ProCode_ERHEBUNG_Set5_Output_Taxa_deleted.txt AND the station sheet in PDF	Output from the electronic tool of the MSK module
	KT_ProCode_ERHEBUNG_Set5_up.jpeg AND KT_ProCode_ERHEBUNG_Set5_down.jpeg OR KT_ProCode_ERHEBUNG_Set5_air.jpeg	Photos documenting Set 5
	KT_ProCode_ERHEBUNG_Set5_Stock*	List of any macrophytes planted, sowed or introduced with cuttings (to be submitted with "after" survey).
6. Macroinvertebrates	KT_ProCode_ERHEBUNG_Set6_V#.xls	Raw data of Set 6 If a spring and summer sample is made, name the documents as follows: KT_ProCode_ERHEBUNG_Set6_V#_Frühling.xls AND KT_ProCode_ERHEBUNG_Set6_V#_Sommer.xls
	KT_ProCode_ERHEBUNG_Set6_Probestelle1.jpeg KT_ProCode_ERHEBUNG_Set6_Probestelle2.jpeg KT_ProCode_ERHEBUNG_Set6_Probestelle3.jpeg KT_ProCode_ERHEBUNG_Set6_Probestelle4.jpeg KT_ProCode_ERHEBUNG_Set6_Probestelle5.jpeg KT_ProCode_ERHEBUNG_Set6_Probestelle6.jpeg KT_ProCode_ERHEBUNG_Set6_Probestelle7.jpeg KT_ProCode_ERHEBUNG_Set6_Probestelle8.jpeg	Photos documenting the sample sites
	KT_ProCode_ERHEBUNG_Set6_Probestellen.shp	Sample sites as point shapefile*
7. Fish	KT_ ProCode_ERHEBUNG_Set7_V#.xls	Raw data and assessment of Set 7
8. Riparian vegetation	KT_ProCode_ERHEBUNG_Set8_V#.xls»	Raw data and assessment of Set 8
	KT_ProCode_ERHEBUNG_Set8_Ind8_1_Fläche.shp AND/OR KT_ProCode_ERHEBUNG_Set8_Ind8_1_Punkte.shp KT_ProCode_ERHEBUNG_Set8_Ind8_2.shp KT_ProCode_ERHEBUNG_Set8_Ind8_3.shp	GIS files for individual indicators from Set 8

Indicator set	Data arising and specified file names	Description
9. Avifauna	KT_ ProCode_ERHEBUNG_Set9_V#.xls	Raw data and assessment of Set 9
	KT_ProCode_ERHEBUNG_Set9_TMOdata.zip	Export file (ZIP) from Terrimap Online (downloadable by clicking the save button in the Terrimap Online precinct view)
10. Society	KT_ ProCode_ERHEBUNG_Set10_V#.xls	Raw data and assessment of Set 10
Set 11	KT_ ProCode_ERHEBUNG_Set11_	No standardised methodological requirements exist for Set 11. However, this data is also to be submitted to the FOEN.

List of modifications
Relevant changes are marked in green.

Date (mm/yy)	Version	Change	Responsibility
4/2020	1.02	Correction of spelling errors, minor terminological modifications	Eawag
4/2020	1.02	Completion Table 5.1 (specification of coordinate system for geodata, addition of point shapefile for indicator Set 6)	Eawag
7/2021	1.03	Completion Table 5.1 (raw data and photos for-Set 6; if available, aerial/ drone-shot photograph (georeferenced) for Set 1)	Eawag
1/2022	1.04	Completion Table 5.1 (specification about the Output-files from the electronic tool that have to be handed in for Set 5)	Eawag
3/2024	1.05	Completion Table 5.1 (clarification of the naming of: Spring and summer sample in Set 6, area or point shapefile from indicator 8.1 in Set 8 and adjustment of the data to be submitted for Set 9)	Eawag