



Last revised: 31.01.2025; Version 1.03

Factsheet 8

From framework to field survey



Publication details

Issued by: Federal Office for the Environment (FOEN)

The FOEN is an office of the Federal Department of the Environment, Transport, Energy and Communications (DETEC).

Authors: Christine Weber, Lucie Sprecher (Eawag), Gregor Thomas, Simone Baumgartner, Susanne Haertel-Borer (FOEN)

Technical advice:

National advisory group: Marco Baumann (TG), Anna Belsler (FOEN), Nanina Blank (AG), Arielle Cordonier (GE), Roger Dürrenmatt (SO), Claudia Eisenring (TG), Martin Huber-Gysi (FOEN), Lukas Hunzinger (Flussbau AG), Manuela Krähenbühl (ZH), Vinzenz Maurer (BE), Nathalie Menetrey (VD), Erik Olbrecht (GR), Eva Schager (NW), Pascal Vonlanthen (Aquabios), Heiko Wehse (Hunziker Betatech), Hansjürg Wüthrich (BE)

International advisory group: Tom Buijse (Deltares, NL), Francine Hughes (Anglia Ruskin University, UK), Brendan McKie (Swedish University of Agricultural Sciences, SWE), Hervé Piégay (Université de Lyon, FR), Phil Roni (Cramer Fish Sciences, Washington, USA)

Eawag advisory group: Ulrika Åberg, Manuel Fischer, Ivana Logar, Bänz Lundsgaard, Katja Räsänen, Dirk Radny, Chris Robinson, Nele Schuwirth, Christian Stamm

WA21: Rolf Gall, Stefan Vollenweider

Citation: Weber, C., Sprecher, L., Thomas, G., Baumgartner, S., Haertel-Borer, S. 2019: From framework to field survey. In: Evaluating the outcome of restoration projects – collaborative learning for the future. Federal Office for the Environment FOEN, Bern. Factsheet 8, V1.03.

Editing of the german version: Evi Binderheim (Sponsolim Umweltconsulting)

Illustrations: Laurence Rickett (Firstbrand), Christine Weber (Eawag)

Cover picture: Eliane Scharmin (Eawag), Laurence Rickett (Firstbrand)

English translation: Jeff Acheson (Acheson Translations & Editing)

PDF download:

www.bafu.admin.ch/outcome-evaluation-resto
(not available in printed form)

This publication is also available in French, Italian and German.

© FOEN 2019

This factsheet explains general aspects of the field survey and describes the structure of the indicator set technical sheets. Further details can be found in the technical sheets for Indicator Sets 1–10.

8.1 Survey principles

The following general principles are applicable for the planning and conduct of surveys:

- *Deployment of experienced professionals:* For each of the 10 indicator sets, the practice documentation contains a technical sheet, which provides instructions for conducting the survey and assessment. These technical sheets are addressed to professionals with specific experience in the area concerned and a sound knowledge of the material required and the relevant safety regulations. The use of personnel lacking appropriate experience is to be avoided for reasons of safety and quality.
- *Local knowledge:* Good local knowledge is crucial, particularly for the determination of the biological indicator sets (e.g. knowledge of local species) and in general for the assessment and interpretation of the data collected.
- *Coordination of all parties:* A variety of professionals are usually involved in outcome evaluation surveys. This makes consultation and coordination all the more important, e.g. with regard to the survey site (Section 8.3) or timing (see Section 8.4). **Particularly when defining the subsection where, among other things, the biological indicator sets are collected, early consultation should be held with all parties involved.** A central coordination office, functioning as a hub for the various consultancies involved, is thus essential.
- *Personnel continuity:* Ideally, the “before” and “after” surveys will be carried out by the same individuals: personnel continuity reduces the risk of data being influenced by different survey personnel and facilitates data assessment and interpretation. In addition, familiarity with local conditions makes it possible to gain valuable time in the preparation and conduct of surveys.
- *Special procedure for deculverting:* For deculverting projects, a “before” survey cannot be conducted. For the assessment of the pre-project condition, values between 0 and 1 are therefore to be entered in the field protocol using professional discretion and subsequently compared with the values from the “after” survey conducted in the field.
- *Use of latest available forms for data collection and entry:* For data collection in the field and for subsequent data entry, the predefined field protocols and entry forms are to be used. These are available on the FOEN website at: www.bafu.admin.ch/outcome-evaluation-resto. Individual documents will be updated over time. Users must ensure that they always use the latest version for surveys and data entry. Further information on data entry can be found in Factsheet 5.
- *Reporting of difficulties or inconsistencies:* Any difficulties encountered in the use of the technical sheets or in data entry should be reported to the FOEN immediately, by sending an email to: wiko_revit@bafu.admin.ch. Rapid notification will ensure that problems are promptly addressed centrally, and that support can be provided for all users.

8.2 Structure of the indicator set technical sheets

The technical sheets for the ten indicator sets are all identically structured. The content shown in Table 8.1 is presented in the different sections.

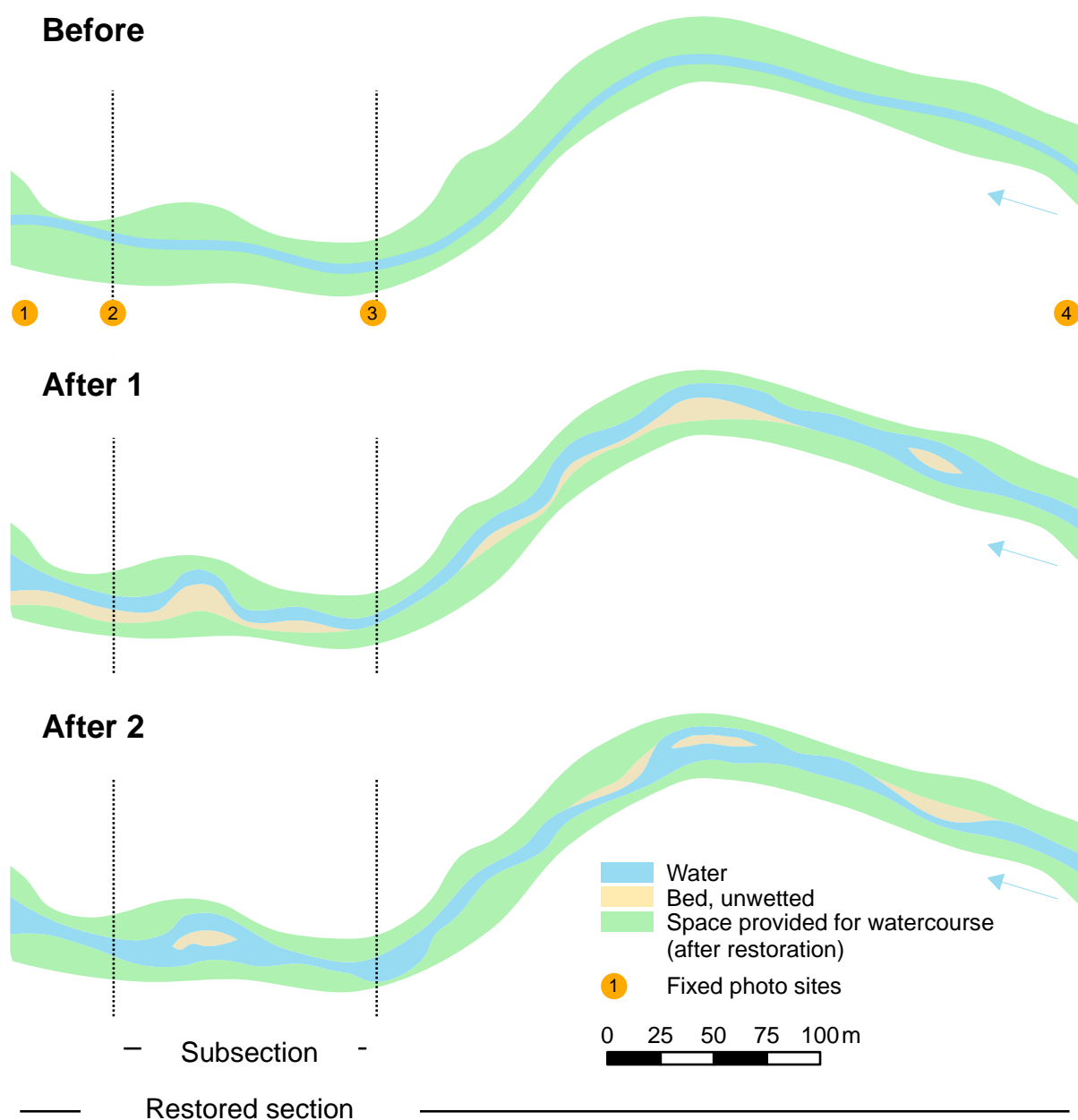
Table 8.1: Content presented in the technical sheets for the ten indicator sets

Section	Content
Title page	Overview of the scope and origins of the indicator set <ul style="list-style-type: none"> • <i>Name and symbol</i> of the indicator set • <i>List of the indicators contained</i>, including sources • <i>Status</i>: Date of the most recent updates to the technical sheet and version number • <i>Publication details</i> listing all contributors
Principle	Aim and purpose of the indicator set and fundamentals of the survey <ul style="list-style-type: none"> • <i>Background</i>: Explanation of the relevance of the indicators and relationship to the nine typical goals of restoration projects • <i>Parameters</i>: Brief definition of the key parameters determined • <i>Applicability</i>: Potential for, and limits to, application • <i>Special considerations</i>: Points to be specifically noted for the survey • <i>Survey site</i>: Site for determination of individual indicators (e.g. subsection, restored section) from a bird's-eye view • <i>Timing</i>: Seasonal time frame for determination of indicators. Need for replicate measurements. • <i>Material</i>: Special equipment required for the survey. The basic equipment for a field survey (writing materials, camera, suitable trousers, sunscreen, etc.) is taken for granted and not specifically listed.
Survey	Framework and procedure for the field survey <ul style="list-style-type: none"> • <i>Procedure</i>: Individual steps involved in the field survey and data analysis, in chronological order
Assessment of data for each indicator	Methods for the assessment of data collected in the field The assessment methods given derive in most cases from the original Indicator method sheets included in the "Handbook for evaluating rehabilitation projects in rivers and streams". These provide guidance and are to be revised in the coming years on the basis of experience accumulated in the STANDARD and EXTENDED outcome evaluation.
Time and personnel required	Estimated personnel and financial costs per survey (e.g. "before" survey) <ul style="list-style-type: none"> • <i>Estimated effort</i>: No. of persons, person-hours and level of expertise (specialists, assistants) required for the various steps. A rough cost estimate can be found in Table 2.1 of Factsheet 2.
Further information	Further information <ul style="list-style-type: none"> • <i>Data arising</i>: List of the data arising for the indicator set; see also Table 5.1 in Factsheet 5. • <i>Attachments</i>: Forms and other documents required for the survey. These are available on the FOEN website at: www.bafu.admin.ch/outcome-evaluation-resto • <i>List of modifications</i>: Details of changes made from one version to the next

8.3 Survey site

The "restored section" refers to the area in which a restoration measure is implemented. It comprises not only the aquatic habitat but also the surrounding area, i.e. at most the space provided for the watercourse after restoration. The location of the restored section is defined and surveyed (coordinates of lower and upper end) at the start of the outcome evaluation, i.e. prior to the "before" survey, and remains unchanged for the "before" and "after" surveys (Fig. 8.1). Certain surveys are performed along the entire restored section, e.g. parts of Indicator Set 1 (mapping of river bed and bank structures; Table 8.2). Other surveys, particularly for the resource-intensive biological indicator sets, but also more detailed investigations of habitat diversity (Indicator Set 1), are performed in a characteristic subsection of the restored section.

Figure 8.1: The restored section and subsection over the course of the “before” and “after” surveys. Direction of flow is from right to left.



The subsection is also defined at the start of the outcome evaluation. It should be situated in a part of the restored section which is particularly characteristic for the purposes of the project. As the project has yet to be implemented when the subsection is selected, the exact location must be determined based on project plans, models or expected changes. **In addition, the location of the subsection should be well coordinated with the experts of the planned biological indicator sets at an early stage.** The subsection has a length of approx. 12 riverbed widths (bank toe to bank toe, after restoration), but is at least 100 m and at most 200 m long. In the case of restorations shorter than 100 m, the subsection covers the entire restored section, and the width is that of the space provided for the watercourse after restoration. The location of the subsection does not change, i.e. it remains the same for the “before” and “after” surveys (Fig. 8.1). The site of the subsection is to be surveyed (coordinates of lower and upper end) and recorded in the field protocols for the indicator sets concerned. Likewise, the restored section and subsection are photographed from fixed locations in the course of the determination of Indicator Set 1 (photo sites 1–4 in Fig. 8.1). An aerial (drone-shot) photograph documenting the entire restored section is recommended.

Table 8.2: Survey site for indicators in the 10 indicator sets. *Plus possible extension (see technical sheet of the relevant indicator set)

Indicator set	Indicator	Survey site
1. Habitat diversity	1.1 River bed structures	Restored section
	1.2 River bank structures	Restored section
	1.3 Water depth	Subsection
	1.4 Flow velocity	Subsection
	1.5 Presence of cover	Subsection
	1.6 Substrate	Subsection
2. Dynamics	2.1 Temporal changes in diversity of geomorphic river bed structures	Restored section
	2.2 Temporal changes in quantity and spatial extent of morphological units	Restored section
	2.3 Change in river bed elevation	Restored section
3. Connectivity	3.1 Inundation dynamics	Restored section
	3.2 Shoreline	Restored section
4. Temperature	4.1 Temperature	Subsection
5. Macrophytes	5.1 Macrophyte community	Subsection*
6. Macroinvertebrates	6.1 Macroinvertebrate community	Subsection
7. Fish	7.1 Fish community	Subsection
	7.2 Age structure of fish population	Subsection
	7.3 Ecological guilds of fish	Subsection
8. Riparian vegetation	8.1 Plant species	Restored section
	8.2 Plant communities	Restored section
	8.3 Temporal shift in the mosaic of floodplain vegetation categories	Restored section
9. Avifauna	9.1 Bird species	Restored section*
10. Society	10.1 Stakeholder acceptance	Restored section

8.4 Timing of surveys

All the indicator sets have specific seasonal time frames within which they have to be determined. In addition, for a survey to be meaningful, certain conditions need to be met, e.g. with regard to discharge. The time frames and conditions for surveys are shown in Table 8.3 and are specified in the technical sheets for all the indicator sets.

Table 8.3: Seasonal time frame for determination of indicator sets. LF = low flow, MF= mid-flow. Dark green = recommended time frame. Light blue = possible time frame.

	Month												Discharge		Notes/requirements	
	1	2	3	4	5	6	7	8	9	10	11	12	LF	MF		
1. Habitat diversity	Light	Light	Light	Light	Light	Light	Dark	Dark	Dark	Dark	Light	Light	✓		Good transparency	
2. Dynamics	Dark	Dark										Dark	Dark	✓		Vegetation-free, Set 1 determined in advance
3. Connectivity	Dark	Dark	Dark	Dark	Dark	Dark	Dark	Dark	Dark	Dark	Dark	Dark	Dark	✓	✓	Modelling
4. Temperature	Light	Light	Light	Light	Light	Dark	Dark	Dark	Light	Light	Light	Light	Light	✓		Assessment of fair-weather periods; Set 1 determined in advance
5. Macrophytes					Light	Dark	Dark	Dark	Dark	Light				✓	✓	Good transparency, Set 1 determined in advance
6. Macroinvertebrates		Light	Dark	Dark	Dark	Dark	Light							✓	✓	Campaign II (optional) from May to September, depending on altitude; Set 1 determined in advance
7. Fish					Light	Light	Dark	Dark	Dark	Light				✓		Good transparency, Set 1 determined in advance
8. Riparian vegetation				Light	Dark	Dark	Dark	Dark	Light					✓	✓	
9. Avifauna				Light	Dark	Dark	Dark	Light						✓	✓	
10. Society	Dark	Dark	Dark	Dark	Dark	Dark	Dark	Dark	Dark	Dark	Dark	Dark				

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	Minor graphical modifications	Eawag
4/2020	1.02	Modification Table 8.3: <ul style="list-style-type: none"> Indicator set 1: Survey possible all year round under appropriate conditions. Specification color code in the table caption. 	Eawag
1/2025	1.03	Clarification of the importance of involving all experts affected by the definition of the subsection.	Eawag