

Challenges and opportunities of using adaptive monitoring in river restoration in Switzerland

Défis et opportunités de l'utilisation d'un suivi adaptatif pour les revitalisations de cours d'eau en Suisse

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RÉSUMÉ

Le suivi adaptatif est une variante de la gestion adaptative et offre de nombreuses possibilités aux professionnels et scientifiques de la revitalisation, telles que l'apprentissage collaboratif et l'ajustement des directives sur la base de preuves. Cependant, bien que des applications théoriques existent, la mise en œuvre pratique du suivi adaptatif est encore rare. En utilisant les principes du suivi adaptatif, un programme national pour un contrôle des effets standardisé des revitalisations de cours d'eau a été mis en œuvre en Suisse en 2020. Dans la présente contribution, nous décrivons à titre d'exemple la mise à jour régulière des directives de terrain comme l'une des nombreuses tâches qui découlent de l'application d'une approche adaptative. Nous illustrons les défis et les opportunités pour chaque étape de ce travail et fournissons des pistes pour le transfert vers des domaines connexes dans la revitalisation et la gestion des rivières.

ABSTRACT

Adaptive monitoring is a variation of adaptive management and offers many opportunities for restoration practitioners and scientists such as collaborative learning and evidence-based adjustment of guidelines. However, although theoretical applications exist, practical implementation of adaptive monitoring is still scarce. Using the principles of adaptive monitoring, a nationwide program for standardised outcome evaluation of river restoration projects has been implemented in Switzerland in 2020. In the present contribution, we exemplify the regular update of the field guidelines as one of the many tasks that arise from applying an adaptive approach. We illustrate challenges and opportunities for each step of work and provide cues for transfer to related areas in river restoration and management.

KEYWORDS

Adaptive management, outcome evaluation, river restoration

1 DESIGNING FOR ADAPTIVE MONITORING AND MANAGEMENT

Outcome evaluation is used to investigate whether a restoration project shows the anticipated effects, i.e. whether the defined objectives have been met and the resources have been effectively deployed. Since 2020, a standardised program has been specified for the outcome evaluation of river restoration projects throughout Switzerland (FOEN 2019; Weber et al. 2017), which follows the principles of adaptive management and, more specifically, adaptive monitoring (Lindenmayer and Likens, 2009).

Adaptive monitoring and adaptive management follow four cyclical phases – planning, doing, evaluating and adjusting. This cyclical process has many advantages. It allows, for example, to continuously integrate new evidence from practical management or science, or to facilitate the exchange of lessons learned across stakeholders (Weber et al., 2017). Adaptive approaches have been much discussed in the past, but rarely implemented in practice.

Using the cyclic process of adaptive monitoring, the standardised Swiss outcome evaluation in river restoration follows the subsequent four phases (FOEN, 2019):

1. Planning of outcome evaluation: Each of the 26 Swiss cantons decides for which of their projects an outcome evaluation is to be conducted. The decision is made by considering different criteria on the suitability of a project to follow the standardized surveys.
2. Conduct of outcome evaluation: Surveys are conducted before and after restoration. The indicators that are assessed need to be aligned with the project objectives. Indicators can be selected from a defined list of standardized methods described in the guidelines (FOEN 2019). The guidelines consist of multiple documents (e.g. factsheets, technical sheets, entry forms) and are updated in regular intervals (see Chapter 2).
3. Data analysis and communication: The Federal Office for Environment (FOEN) is responsible for the centralised cross-project storage and analysis of data gathered in the cantons as well as the dissemination of results. Several formats will be used for dissemination including articles in scientific and trade journals, news items for the public, workshops and conference contributions.
4. Conclusions and adaption: In a participatory process involving all relevant stakeholders, findings from outcome evaluation are translated into recommendations for action. These are fed into regulatory guidelines (e.g. for project funding) and decision-making aids for the cantons (e.g. for strategic river restoration planning).

Having an adaptive system only makes sense if phase 4, the adaptation, can be completed. In order for this to be possible, timing is crucial. In Switzerland, the strategic planning of river restoration projects is redefined every 12 years. Considering this management cycle, it was decided that the recommendations for action from the outcome evaluation need to be ready 1-2 years prior the next strategic planning, allowing for adaptations in the planning and execution of future restoration projects by the cantons.

2 IMPLEMENTING AN ADAPTIVE MONITORING PROGRAM

The conceptualisation and implementation of the standardised outcome evaluation of river restoration has been directed by the FOEN with support of the Swiss Federal Institute of Aquatic Science and Technology (Eawag). Selected members from both sides form the core team of the program and take responsibility for phases 3 and 4 (see Chapter 1). Since the implementation two years ago, different tasks have risen for the core team, such as the initiation and promotion of the collaborative learning process or the support and advise of the cantons in the planning and conducting of the outcome evaluation.

All these tasks have opportunities and challenges. Some of them are dealt with by using an adaptive approach. It was for example decided that the guidelines should be updated by some members of the core team (“guideline editors”) every 6 months in order to correct typos, to specify the field surveys based on users’ feedbacks or to refine the evaluation of the indicators. Figure 1 gives a chronological overview of the steps that are taken for updating the guidelines as well as their challenges and opportunities. Main challenges include that regular update is time consuming and that keeping track on all levels can be difficult. Main opportunities include the flexibility of adaptation, continuous collaborative learning and collective intelligence for updating the guideline.

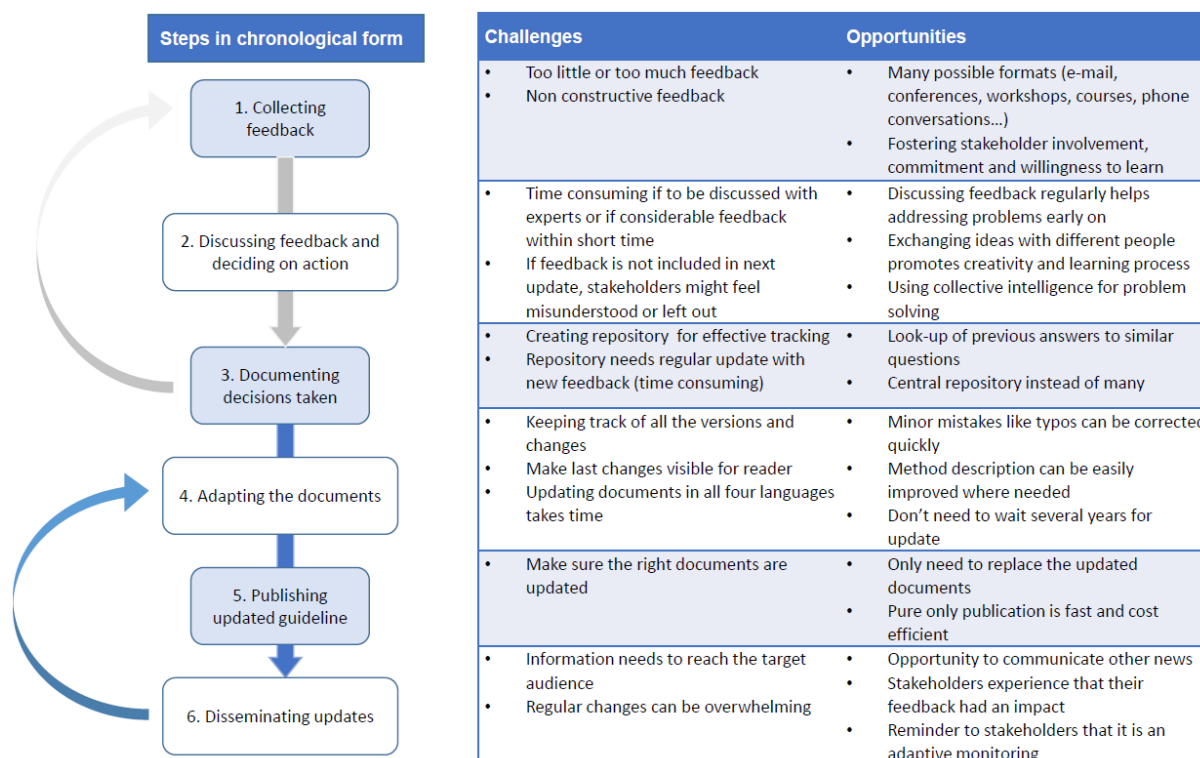


Figure 1: Challenges and opportunities of each step used for updating the guidelines. The gray arrows represent a continuous process for steps 1, 2 and 3. Steps 4, 5 and 6 are only undertaken every 6 months, which is represented by the blue arrows.

1. **Collecting feedback:** The guideline editors constantly look for feedback from users of the guidelines in order to critically review the status quo and to identify what can be improved, optimised or added. There are several formats where feedback is being collected, including informal (online) meetings for peer-to-peer exchange, e-mails, web platforms, courses and conference talks.
2. **Discussing feedback and deciding on action:** Some feedback need to be discussed with experts before the guideline editors can decide to include it in the guidelines or not.
3. **Documenting decisions taken:** In order to guarantee transparency and reproducibility, it is crucial to keep track of the discussions held and decisions taken. The guideline editors keep a track record (Excel-Sheet) with all the question(s)/answer(s), the date, the decision taken and the contact information of the people involved.
4. **Adapting the documents:** Every 6 month, i.e. at predefined periods of the year, the guideline editors integrate all the feedback from the last months into the respective documents of the guideline. This can be time consuming as most documents are available in four languages (German, French, Italian, English). Special care is being taken for making the most recent changes clearly visible for the users by (i) colormarking, (ii) new version numbers of the documents and (iii) modification history lists at the end of each document.
5. **Publishing updated guideline:** Once the documents have been adapted, they need to be published. It was decided at the onset of the monitoring program that all components of the guideline are being kept as separate documents for download from the FOEN website, meaning that there is no printed version. This keeps expenses to a minimum and allows for regular update of selected documents.
6. **Disseminating updates:** When, what and with whom information is being shared is very important. Depending on the information to be shared and the targeted audience, the format of communication must be selected. In this example, registered users of the guidelines are updated every 6 months about changes in the guideline via e-mail.

An adaptive approach for monitoring guidelines as it is being done in Switzerland is unusual. Guidelines are typically only updated once every several years, if updated at all, slowing down the process of integrating new evidence from science and practice. Although it comes with a significant amount of work and requires careful planning, the opportunities of collaborative learning outweigh the challenges. Adaptive monitoring therefore seems to be a suitable approach for complex, long-term endeavours such as outcome evaluation of river restoration. However, the implementation of the standardised nationwide program started only two years ago, allowing for learning and optimisation in the years to come.

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