

**Problem Tree Analysis & Tree of Objectives**

A problem tree analysis can be used to review the cause effect of key issues for rehabilitation measures (Figure 6. Structure of problem tree analysis.. It is critical that existing issues are identified as well as future issues that may arise because of planned development, e.g. a new hydropower development. A problem/issue is not the absence of a solution (e.g. no land available for reinstating the natural water course) but an existing negative impact (e.g. obstructions to fish migration). Conflicts between user groups can be highlighted. Throughout the analysis there is a need for comprehensive discussion with stakeholders to understand their needs, motives and drivers. An example of a problem analysis is shown in Figure 7 with reference to channelization and disconnection of the floodplain.

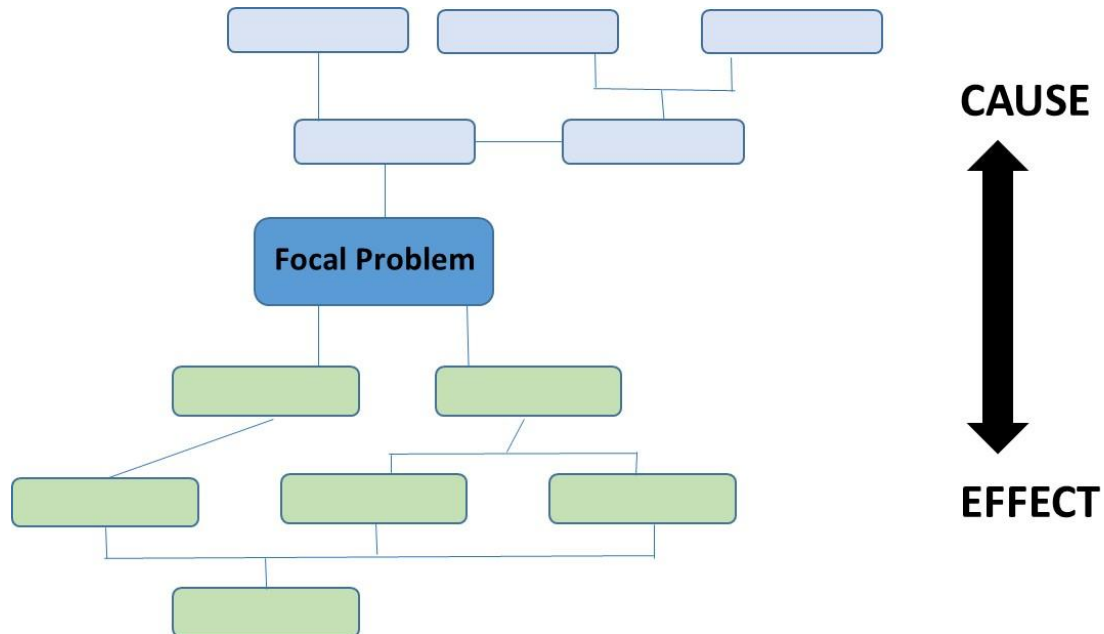


Figure 6. Structure of problem tree analysis.

An objective tree is closely linked to a problem tree and can be created by rephrasing each of the problems into desirable outcomes, this way the root causes and consequences are turned into root solutions. This process is designed to help the project manager think about the key aspects of the river restoration project and what the project is setting out to achieve, and to recognise the inherent complexity and constraints.

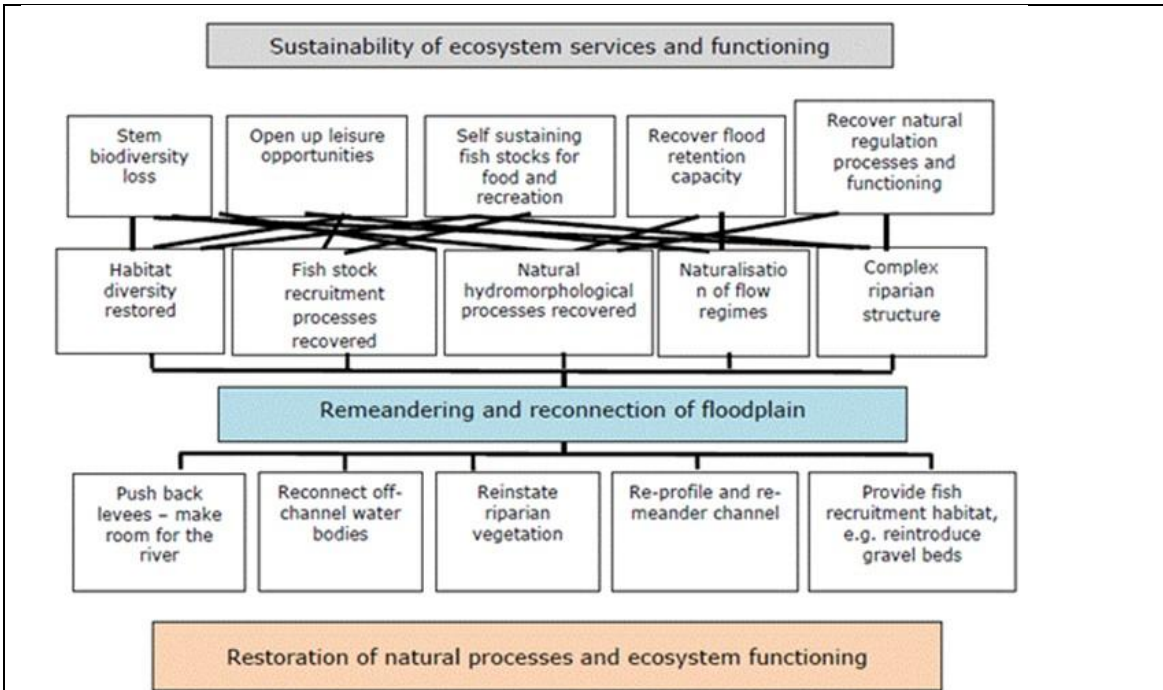


Figure 7. Example of objective tree analysis related to channelization and disconnection of the floodplain.

The outputs can be used to construct a matrix table that defines the issue (cause and effect) and reviews the potential options for resolving the issue, the best restoration measure to achieve the desired endpoint (Error! Reference source not found.). Since there is likely to be more than one option (measure) or a combination of measures to resolve an issue, the advantages and disadvantages of each should be considered and their inter-linkages explored. In addition this analysis should include the feasibility of achieving the outcome of the stated option both from a technical as well as a financial perspective, but also to identify win-win scenarios (REFORM D5.3). Consequently, the plans should be based on local issues but consider the catchment and regional/national context (section 1.1).

Table 5. Structure of table to undertake options analysis.

Issues (Cause and effect)	Options	Advantages	Disadvantages	Responsibility
e.g. Channelisation & disconnection	Set levees back	Recover flood plain	Not suitable for urban area	Environment Agency, Rivers Trust
Barrier due to hydropower	Fish pass	Longitudinal connectivity	Not suitable for all fish species	Hydropower company to pay for fish pass.