Partial or total weir/dam removal

Removing dams or weirs totally or partially to restore river dynamics and river continuity.

Objectives

Hydromorphological objectives

• Stimulate river dynamics through renewed sediment transport and, when a water abstraction is associated with the obstacle, through the restoration of the flow.

• Restore the slope and long section of the river adapted to the energy and the grain-size distribution of the river.

• Diversify the flow patterns and habitats in the riverbed, i.e. depths, velocities, substrates (reappearance of coarser substrates, e.g. gravel, boulders).

• Diversify the cross section.

• Restore the hydrology, if applicable.

Ecological objectives

• Recreate habitats favourable to the life cycles of the targeted species in the reservoir (impoundment) or downstream.

• Restore the aquatic species composition and improve the ecological status in the impounded reach and upstream/downstream of it.

• Improve the free movement of aquatic species (fish, crayfish, etc.) and encourage the genetic mixing of the reconnected populations.

• Contribute to extending the distribution of migratory fish populations.

• Improve the capacity for self-cleaning of rivers by restoring exchanges in the hyporheic zone and on the surface, in the former impounded reach above of the structure.

• Limit alterations in the environment caused by the impoundment (eutrophication, warming of the water, evaporation).

Other expected benefits

• Promote the landscape and recreational activities.

• Enhance resilience.

• Reduce the costs of maintenance and management arising from the obstacle.

Answers to preconceived ideas

• Even if the average depth of water upstream of the structure is reduced, the restored river dynamics will, over time, create new deep areas (pools) that can serve as habitats for diversified fish populations.

• The removal of a transverse obstacle will not necessarily result in the drying of wetlands. Diversified wetlands created by the restored river dynamics and offering better functions can come into being.

• Given that the impoundment is not intended to store flood waters, its replacement with a functional river does not increase the risks of harmful flooding.

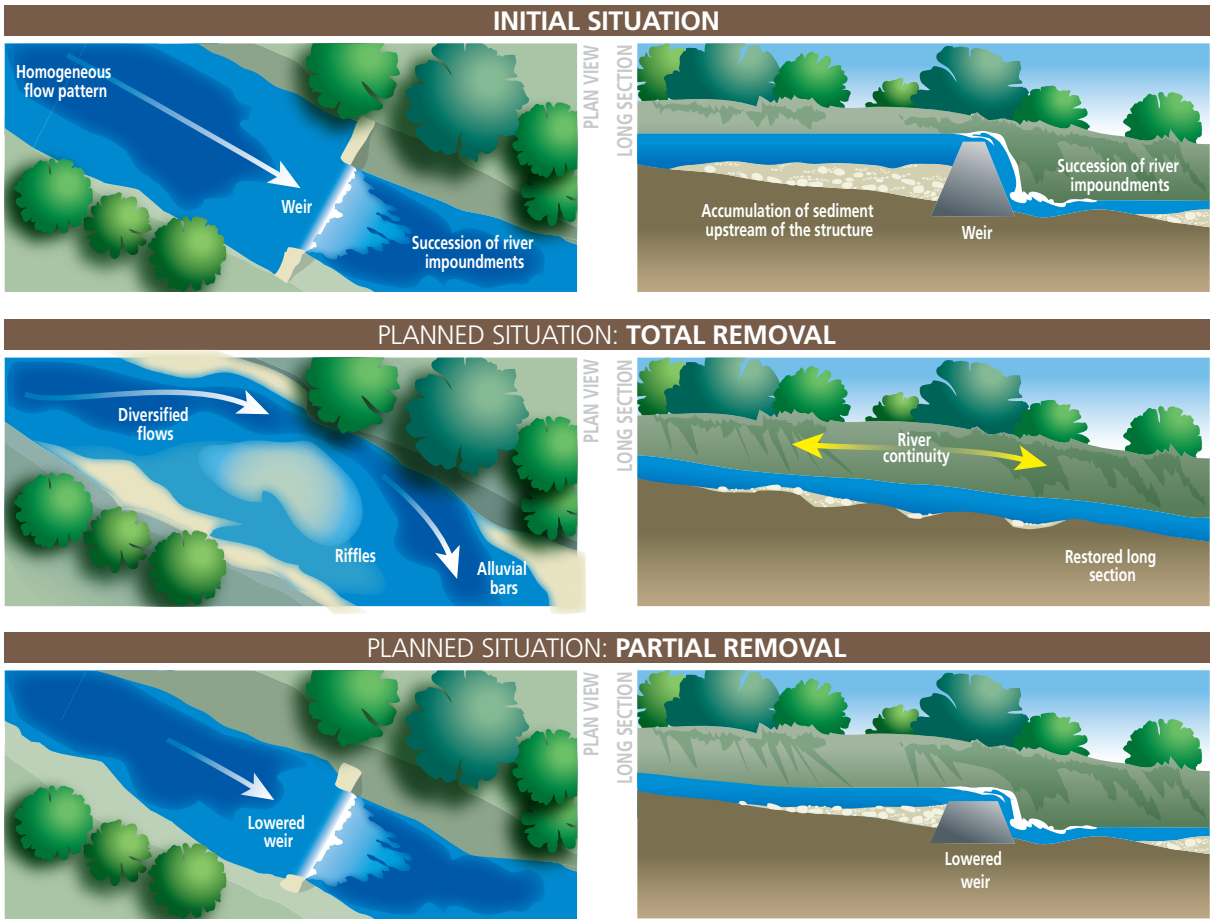
Examples of possible technical solutions

• Total removal of the weir, i.e. its destruction.

• Partial removal of the weir by reducing the height of the crest or by leaving a hard, man-made bund along the river bottom. Potential solutions include :

- a reduction in the height of the entire weir, from bank to bank;
- a reduction in the height of part of the overflow crest;
- opening or removal of gates.

For rivers lacking in self-adjustment, in the former impoundment it is necessary to assist the morphological adjustments so that the new riverbed corresponds as closely as possible to the bed prior to the creation of the structure *[see the data sheet on «Recreating meanders»]*.



Graphies

Additional aspects

Complementary measures

Depending on the local context and type of river, it may be necessary to :

• manage sediment deposition to encourage the transport of coarse sediment (raking),taking care to avoid pollution of the water and aquatic environments by fine sediment during the emptying of the reservoir ;

• plant worked surfaces and bare banks to limit colonisation by undesirable species and encourage the establishment of riparian vegetation on the banks;

• delimit an acceptable mobility space for the watercourse and set up management rules for the areas along the river ;

• if the removal is only partial, make any changes required to encourage the passage of fish (upstream and downstream migration, etc.) and downstream reloading of sediment ;

• when the removal is only partial, if required carry out works on the remaining weir and/or the management of gates to encourage sediment transport ;

• recommend monitoring of ground water levels if there are risks for water abstraction or if a remarkable wetland is threatened ;

• make specific adjustments if infrastructures (bridges, etc.) are at risk of impact, for example stabilisation of sections of banks, preferably with ecological engineering techniques, or reinforce the foundations of a structure affected by the change in the riverbed ;

• plan on ecological monitoring for projects with special interests or innovative aspects *[see the data sheet on «Monitoring and assessing the ecological effects of a hydromorphological-restoration project»].*

Pointers for project design

• Study all transverse obstacles in a relevant river sector (main river stretch, migratory fish route).

• Study on a case-by-case basis the solutions for each structure.

• Monitor the hydromorphological readjustment of the river bed and the fauna and flora to detect any unexpected effects. Set up complementary measures to correct the situation.

Technical bibliography for the design and implementation of the project

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