

# Rhône Sediment Management Master Plan between Geneva and Mediterranean Sea in order to achieve good ecological status

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**Introduction:** The study leading to the Rhône Sediment Management Master Plan between Lake Geneva and the Mediterranean Sea, carried out by a DREAL / CNR / EDF / Water Agency partnership, was finalized in October 2022. This is the outcome of a long process of compiling and summarizing technical, scientific and social data in order to guide management and restoration measures for the river and reach 2027-2050 objectives.

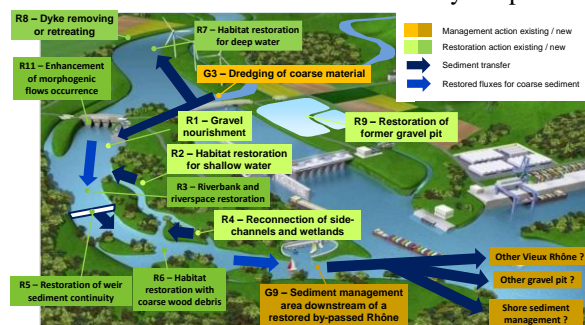
**Methods:** These objectives are organized into 3 categories: biodiversity, safety-security, socio-economics. Biodiversity objectives are especially linked to the achievement of the good ecological status and potential according to WFD. Safety-security objectives deals with the safety of dams and the security of the populations against flood events. The sustainability of the socio-economic uses, under climate change uncertainties, concern navigation, hydroelectric plants, nuclear power plants, drinking water production, irrigation and leisure activities.

**Results:** The study valued and completed the works of the Rhône Scientific Observatory of Sediment (OSR4-5 Program). The sedimentary fluxes of the Rhône have been updated, showing a good continuum for silt and sand, whereas bedload continuity is strongly affected by impoundments and run-of-the-river dams. Sediment balances has been established over the last four decades and identify degraded and aggraded reaches.

At the same time, the sedimentary contributions of the tributaries were estimated from existing watershed studies and dredging operations carried out at the confluences; the future trends of these inputs - stability, drying up or return of sediments - have been analysed, in connection with climate change and the role of implementations in these catchment areas. Feedback from the past actions shows that for 25 years (from 1995 to 2018), nearly 300 sites have been the subject of management interventions by dredging, with a total volume of 850,000 m<sup>3</sup>/year. Flushing and sluicing dams complete the management measures. In parallel, the Rhône and its hydrosystem has been restored on around 150 sites : increase of biological

flows, restoration of around 80 secondary arms, reactivation of alluvial margins, and first sedimentary reinjections since a few years.

**Discussion:** The means for the master plan, focusing on the previous objectives, are based on key actions, including innovative actions such as coarse sediment nourishment or morphogeneous flows. These actions must lead to better continuities for coarse sediments, that must accelerate the achievement of good ecological status (18 over 26 water bodies by 2027; all of them by 2050). The operational objective is to gradually increase the annual reinjected volume from 40,000 m<sup>3</sup> over 1995-2018 to around 200,000 m<sup>3</sup>/year by 2030-2035, giving priority to by-passed reaches (Vieux Rhône), with high ecological value and needing to be resilient to climate change. The strategic orientations are formulated along major sectors and are accompanied by recommendations, technical toolboxes, factsheets, etc. in order to accelerate and improve the operational implementation. During 2023, this master plan will be discussed by the Rhône basin committee in order to be definitively adopted.



**Fig. 1:** Summary of sediment management key-actions to achieve better sediment management and good ecological status

**References:** [1] Laval F. et al. (2022). Etude préalable au schéma directeur de gestion sédimentaire du fleuve Rhône du lac Léman jusqu'à la mer Méditerranée. Phase 2. GINGER-BURGEAP and other engineering offices. Technical secretariat: DREAL, CNR, EDF, Agence de l'Eau.