

# Sediments management in small hydroelectric basins: Italian case studies

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**Introduction:** Most Italian hydroelectric basins are small reservoirs located in environmental sensible areas. As a leader environmental consulting company, URS supports main Italian power generation company (Enel) for regulatory compliance issues related to hydroelectric basins management. Present paper outlines Italian regulations about sediments management in artificial basins and presents some of the methodologies, currently accepted by Authorities, for issues which are not considered by enforced laws.

**Methods:** The first part of the paper outlines sediments characterization and management, according to enforced Italian laws.

One of the main aspects of sediments management, sediments fluitation, is not fully considered in existing laws. Sediments fluitation is a sediment removal technique which offers relevant advantages compared to other techniques (such as mechanical digging): the overall cost of the operation is very low, the environmental impact is limited in time and some durable environmental advantages exist.

The paper focuses on case studies relative to characterization and monitoring methodologies currently accepted by Italian Authorities for the performing of such operations.

The main phases of sediments fluitation are presented:

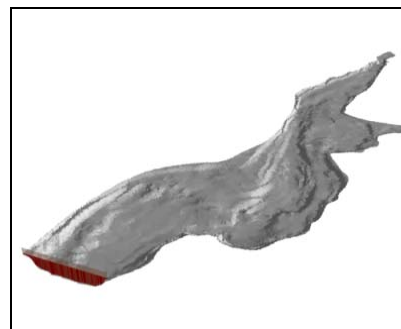
- Sediments quality assessment
- Sediments amount estimation
- Basin water column characterization
- Characterization of the river downstream the dam
- Environmental monitoring during and after the sediments fluitation



**Fig. 1:** Before-during-after sediments fluitation from river outlet

About sediments quality assessment, some cost-effective sampling techniques are presented. Usual required analytical determinations are listed.

About sediments amount estimation, some cost-effective bathymetric surveying methodologies are presented, and 3D renderings for volumes calculations are illustrated.



**Fig. 2:** Basin bottom 3D rendering.

Usual determinations for water column and downstream river quality assessment are briefly illustrated.

Some of the environmental monitoring techniques applicable to sediments fluitation are presented. Continuous and non continuous techniques are considered such as real time multi-probe monitoring and medium/long-term benthic community census (Ghetti, 1997).

**Results:** A general overview of Italian regulation about sediments in artificial basins is presented, focusing on an important aspect such as sediment fluitation which is currently not fully considered. An integrated methodology for managing this operation is proposed.

**Discussion:** The main issue is about the need of an integrated approach for sediments fluitation, both from a legislative point of view and from a technical point of view.

**References:** -Ghetti P.F., 1997 - *Indice Biotico Esteso (I.B.E.). I macroinvertebrati nel controllo della qualità degli ambienti di acque correnti. Manuale di applicazione.* Provincia Autonoma di Trento, Trento