



## Contact

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# Erosion & sedimentation

Where sedimentation is an issue, it can be addressed through both catchment and reservoir management. Dam construction should be geared to ensuring minimum disturbance and appropriate rehabilitation to avoid sedimentation and erosion risks up and downstream of the project site.

## Issue

The creation of a reservoir changes the hydraulic and sediment transport characteristics of the river, with implications for sediment and erosion processes at the reservoir, in the downstream river system, and in cases in the estuarine/deltaic zone. The natural sediment load in a river is usually trapped within the storage and this material is deprived to the downstream river system. Sediment accumulation is a sustainability issue for some reservoirs and in cases can reduce the long-term viability of developments. Erosion issues in the reservoir itself can occur depending on the lake level operating regime, the retention of stabilizing vegetation, the control of recreational activities on the lake, and other factors such as wind-induced wave action or rapid draw-downs.

Impacts of a reduced sediment load to the river downstream of a power station may arise depending on the pre-existing sedimentation and erosion patterns, the nature of the regulated flow release and the altered flooding regimes, and the riparian vegetation condition. Where diversions out of river systems have occurred, and sediment inputs continue from the downstream catchment, channels can accumulate sediments, vegetative species may encroach on the river channel, and this can exacerbate the impacts of floods. Downstream of power stations, reduced sediment loads and in cases, higher than natural base flows, may lead to erosion of the existing channel sediments and destabilization of riparian vegetation through a range of mechanisms, e.g. rapidly fluctuating discharges, rapid water level draw-downs, or continuous discharges at a single flow.

## Management

Sediment and erosion issues need to be considered and assessed at the catchment, reservoir and downstream areas. Where it is an issue, reservoir sediment accumulation can be reduced through cooperation with local communities and regulatory authorities to improve catchment management practices. Specific catchment controls on road construction, mining, agriculture or other land uses may

be employed, or the upper catchment vegetative cover protected through reservation. Specific management actions such as terracing, upstream check structure or reforestation can be employed in the catchment. Within the reservoir, approaches such as sediment by-pass systems for floodwaters, gated structures for sediment flushing, sediment trapping and filtration systems, or direct dredging have all been utilized to deal with high reservoir sedimentation rates.

Where erosion is identified as a project risk, water management measures that can be employed to address shoreline erosion both in reservoirs and downstream river systems include changes to operational patterns, such as ramp-down rules, constraints on time spent at particular operating levels, or even operating to maintain the stabilising characteristics of existing or planted vegetation. Re-regulation storages can be constructed to dampen rapidly fluctuating flow releases from power stations and attenuate the downstream flows. Direct intervention techniques that can be employed to address shoreline erosion involve the use of rip-rap or bank protection works, or directly planting stabilising vegetation.

Sediment accumulation in downstream river systems can be addressed by careful removal of sediment retaining weed species, such as willows, and replanting with more appropriate species. Sediment flushing of the river channel itself through controlled releases can also be employed where shown to be effective.