

Mutual Interaction of Human-Impacted River Runoff under Risks of Eutrophication and ENSO Extremes at the Scales of Lakes and Reservoirs

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Human-impacted ecosystems affect both river runoff and inherent risks to society. At significant spatiotemporal scales, lakes and reservoirs gather a complexity of multiple risks with opportunities for decision-making under uncertainty. However, a reminder for classical and novel challenges of whichever-scale model addressing these problems is needed. In this contribution, we discuss some theoretical and practical problems, with solutions, related to the mutual interaction of both human-impacted river runoff with risks. Ranging feedbacks from local-to-global water-systems, we here mainly enhance yardsticks at the scales of lakes and reservoirs. We introduce sections, extracted from Japan-Brasil research partnership programs, adapted to the needs of international initiatives like UNESCO-IHP-IIWQ, ILEC and Pantha Rei. Firstly, eutrophication and climate-driven extremes like ENSO hazards are becoming as relevant as problem-oriented hotspots of classical approaches in poor or ungauged systems. Updating from a former review (i.e. Mendiando, 2008^{***}), on the one hand, we depict how eutrophication-under-ENSO risk stressors, multiple restoration measures, treatment costs, and planning scenarios do help to better model and manage those inherent risks under different adaptation strategy options. On the other hand, we present example of demonstrative pilot programs, viable to be replicated under regional and global approaches, to control and mitigate eutrophication of urban-affected reservoirs. Finally, we share resilience matrix of indicators and variables which help allied global management initiatives towards stakeholder`s empowerment.

*** Supplementary Material:

http://wldb.ilec.or.jp/ILBMTrainingMaterials/resources/eutrophication_challenges_presentation.pdf,
http://wldb.ilec.or.jp/ILBMTrainingMaterials/resources/eutrophication_challenges.pdf

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