Cumulative impact of small reservoirs;: a review of estimations and methods

Florence Habets, Jérôme Molenat, Nadia Carluer, Olivier Douez, Delphine Leenhardt

▶ **To cite this version:**

Florence Habets, Jérôme Molenat, Nadia Carluer, Olivier Douez, Delphine Leenhardt. Cumulative impact of small reservoirs;: a review of estimations and methods. EGU General Assembly 2020, May 2020, Vienne, Austria. 10.5194/egusphere-egu2020-10100 . hal-03052784

HAL Id: hal-03052784
https://hal.inrae.fr/hal-03052784v1

Submitted on 11 Dec 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Distributed under a Creative Commons Attribution 4.0 International License

EGU2020-10100
https://doi.org/10.5194/egusphere-egu2020-10100
EGU General Assembly 2020
© Author(s) 2020. This work is distributed under
the Creative Commons Attribution 4.0 License.

Cumulative impact of small reservoirs : a review of estimations and methods

Florence Habets[2], **Jérôme Molénat**[1], Nadia Carluer[3], Olivier Douez[4], and Delphine Leenhardt[5]
[1]LISAH, Univ. Montpellier, INRAE, IRD, SupAgro, Montpellier, France
[2]ENS, Laboratoire de géologie, CNRS,Paris, France
[3]INRAE, UR RiverLy, F-69625, Villeurbanne, Lyon-France
[4]BRGM, Bordeaux, France
[5]AGIR, INRAE, INPT, Toulouse, France

Due to a reduce cost, availability of many favorable locations, easy access due to proximity, the number of small reservoirs has increased, especially in arid and semi-arid regions. The cumulative impact of reservoirs in a catchment is considered as the modifications induced by the reservoir network taken as a whole. The impact may exert on the flow regimes and sediment, nutrient and contaminant transfer, and thereby modify the ecological behaviour of the aquatic environment, the continuity of rivers and the habitats of organisms living in them. The cumulative impact is not necessarily the sum of individual and local modifications, because reservoirs may be inter-dependent. This is the case for instance in cascading reservoirs along a stream course. The cumulative impact is not straightforward to estimate, even solely considering hydrological impact, in part due to the difficulty to collect data on the functioning of those reservoirs. However, there are evidences that the cumulative impacts are not negligible.

This work is dedicated to a review of the studies dealing with the cumulative impact of small reservoirs on hydrology, focusing on the methodology as well as on the way the impacts are reported. It is shown that similar densities of small reservoirs can lead to different impacts on the quantitative water resource in different regions. This is probably due to the hydro-climatic conditions, and makes it difficult to define simple indicators to provide a first guess of the cumulative impact. The impacts vary also on time, with a more intense reduction of the river discharge during the dry years than during the wet years. This is certainly an important point to take into account in a context of climate change.

Habets, F., Molénat, J., Carluer, N., Douez, O. and Leenhardt,D, 2018, The cumulative impacts of small reservoirs on hydrology: A review, Science of The Total Environment, 643, 850-867, doi.org/10.1016/j.scitotenv.2018.06.188