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Two pilot projects on climate change impacts and adaptation of watershed management in Southern Quebec, Canada

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Potential adverse impacts of climate change on water resources and their uses have been studied extensively during last years while works on potential applicability of adaptive measures are still rare. As the first milestones in the process of defining climate change adaptation strategy for watershed and public dam management in the province of Quebec (Canada) a study on two pilot subwatersheds was performed with the objective to develop a methodology for evaluating the adaptation potential of integrated watershed management. The first watershed selected is the Upper Saint-François river subwatershed, in which two public dams are located. The second subwatershed is the Châteauguay River watershed, on the southwest boarder of Quebec where there is currently no water storage mechanism, despite an increasingly salient need for water supply management during low-flow periods in order to satisfy the significant needs of truck farming. From a technical point of view, the project was based on preliminary climate change scenarios and on deterministic hydrological modeling with daily time steps to evaluate the impact on hydrology of these two basins. The model, which reproduces the behaviour of the watershed and its management in current climate conditions, has provided the basis for comparison and analysis in the evaluation of climate change conditions.

Main conclusions of the study regarding reservoir management purposes were that only slight adjustments would be required on current operational management plan to keep almost unchanged the current trade-off between the various management objectives except for hydro-energy productions that will decline. It is important to point, however, that no unique solution applicable to all climate scenarios was found. On the

second pilot subwatershed, the study has evaluated that whatever the climate change scenarios may have been simulated, the needs for irrigation water supply would increase by ten to twenty percents under future climate conditions. Considering that no integrated water storage management is implemented on that subwatershed, it has been evaluated that local water courses capacity would not be sufficient to sustain such an increase in water needs. Water supply for truck farming being only one of numerous possible water uses that could take place in a watershed, integrated watershed management must be considered as an essential way to plan adaptation to climate change effects in water resource management.