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Manipulation of river discharge in Suldalslågen, and its effect on the water temperature

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Suldalslågen is a major salmon river in western Norway, famous for its large species. The river has been regulated since 1966 with the last major development in 1980. Suldalslågen flows from Lake Suldalsvatn to the fiord. Since 1980 “cold” water from a mountain reservoir is fed into the lower part of Lake Suldalsvatn through Kvilldal hydro power station, and further downstream most of the water is led directly to the fiord through Hylen hydro power station. Hence, the water released through Suldalslågen is a directe loss in the power production. The river is therefore one of the best investigated rivers in Norway due to the efforts to maintain the large salmons in spite of the heavy regulations.

Water temperature is a very important factor in the river biology. It is assumed that the best water temperature for the local salmon is the “unregulated” temperature, defined as what the water temperature would be like if there was no regulation. Therefore we modelled the discharge needed to maintain a temperature regime fairly equal to the “unregulated” temperature. The model CE-QUAL-W2 was used to model the water temperature in the lower part of the lake, and the temperature part of the ice model RICE was used to model the changes down the river. The results show that it is possible to achieve “unregulated” water temperatures with a reasonable river discharge.