Ruppoldingen nature-like fish pass and reproduction channel, Switzerland

The nature-like fish pass of Ruppoldingen, entrance near to the power plant (J. Jormola)

The bypasses were accomplished in connection with the renewal of the power plant Ruppoldingen in the river Aare, a tributary of the Rhine, in 1996-2001. They were constructed to mitigate impacts of hydropower, enabling fish migration and compensation of lost reproduction habitats of endangered species.

The bypasses consist of a 155 m long nature-like fish pass, with an entrance near the turbines and a separate 1,2 km long bypass channel with an entrance downstream. The long bypass channel has partly two arms, one with gravel riffles and shallow water and a deeper arm for migration. The arms are combined with large and deep pools. The bypass channel has been planned to resemble natural alpine small rivers. The channel system has a combined water intake and upper section, from which 400 l/s is diverted to the fish pass and the rest of the discharge, 1,5-4,5 m3/s to the bypass channel. The height of the dam is 6 m. The mean gradient in the fish pass is 3,8% and in the bypass channel 0,4%.

The bypass channel with diversified current velocities and bottom substrates has proved to function for several fish species and life stages. Big fish individuals of pike, carp, barbell and wels catfish have been noticed to use the bypass channel. The bypass channel has proved to serve as a new reproduction area for grayling *(Thymallus thymallus),* as juveniles have been found.

The long bypass channel of Ruppoldingen with reproduction habitats (J. Jormola)

The Ruppoldingen power plant with the bypass channel system fulfils the requirements of the certificate Naturemade Star, which is considered to be the most demanding labelling of renewable energy in Europe.

The concept of the Ruppoldingen bypasses, where a long bypass enables habitats and a fish pass with an entrance near to the power plant ensures functioning for migration, will be applied in future fish pass projects along the river Rhine and its tributaries. An equal reproduction channel but with more discharge, will open in Rheinfelden at the Rhine in spring 2012.