2014

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ABSTRACT

The Polyphyto Hydroelectric Project was constructed in 1974 and it has been operating since on the Aliakmonas River, Kozani prefecture, by the Greek Public Power Corporation. The construction of the Ilarion Hydroelectric Project, upstream from the Polyphyto Reservoir, has been recently completed and will start operating in the near future.

Apart from hydroelectric power production, the Polyphyto reservoir provides flood control to the areas below the Polyphyto dam. It is also used to manage water provision to the city of Thessaloniki and adjacent agricultural plain, providing at the same time cooling water to the Thermo Electric Projects in Ptolemaida.

The Polyphyto reservoir has potential for further development as an economic fulcrum to the region in which is located. The Kozani and Servia–Velvendos Municipalities have proceeded to the construction of several touristic, nautical – athletic and fishing projects. In order to promote such developments, while preserving the artificial wetland, flora and fauna of the Polyphyto Reservoir, it is important to reduce the fluctuation of the reservoir elevation which according to its technical characteristics is 21m.

The aim of this paper is to propose the combined operation of the two Hydroelectric Project reservoirs to satisfy all the present Polyphyto Hydroelectric Project functions and to reduce the annual fluctuation of the Polyphyto Reservoir. The HEC-5, Version 8 / 1998 computer model was used in our calculations, as developed by the Hydrologic Engineering Center (HEC) of the US Army Corps of Engineers for reservoir operation simulation. Five possible operation scenarios are tested in this paper to show that the present fluctuation of the Polyphyto Reservoir can be reduced, with some limitations, except during dry weather periods.

Key Words: Polyphyto Hydroelectric Project, Aliakmonas River, artificial wetland, reservoir elevation, reservoir operation, simulations