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Combined Effect of Global Warming and Water Structures on Rivers' Water Quality and Aquatic Life: Case Study of Esna Barrage on the Nile River in Egypt

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Abstract : Global warming and climatic change are very important topics that are being studied and investigated nowadays as they have lots of diverse impacts on mankind, water quality, aquatic life, wildlife,...etc. Also, many water and hydraulics structures like dams and barrages are being built every day to satisfy water consumption needs, irrigation purposes and power generating purposes. Each of global warming and water structures alone has diversity of impacts on water quality and aquatic life in rivers. This research is investigating the dual combined effect of both water structures and global warming on the water quality and aquatic life through mathematical modeling. A case study of the Esna Barrage on the Nile River in Egypt is being studied. This research study is taking into account the effects of both seasons; namely, winter and summer and their effects on air and hence water temperature of the Nile reach under study. To do so, the study is conducted on the last 23 years to investigate the effect of global warming and climatic change on the studied river water. The mathematical model is then combining the dual effect of the Esna barrage and the global warming on the water quality; as well as, on aquatic life of the Nile reach under study. From the results of the mathematical model, it could be concluded that the dual effect of water structures and global warming is very negative on the water quality and the aquatic life in rivers upstream those structures.

Keywords : aquatic life, barrages, climatic change, dissolved oxygen, global warming, river, water quality, water structures
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