

A Review of Stream Regimes Manipulation System Effects on Drainage Basin and Remedies

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ABSTRACT

Naturally, a drainage basin harbours stream flow and channel characteristics in an open system. Urbanization effects on hydrological cycles and on stream morphology and dynamics, as in Anderson (1970) causes naturalized changes in channel characteristics as explained (Mrowka, 1974; Schumm 1977) and flood plain characteristics. These man's efforts and their consequences draw several attentions to changing channel morphology and hydraulic geometry of stream channels by studies such as in Troxell and Leopold (1971), Hammer (1972), Knox (1977), Knight (1979), Morisawa and Vemure (1976), Morisawa and Laflure (1979), Ebisemiju (1989). Such situation reviewed in this paper have disturbed the entire watershed and channels as emaciated in the works of Simon (1992), Simon and Hupp (1992), Oyegun (1994), Church (1992), Pizzuto (1994), Elliot and Gyetuai (1999).

INTRODUCTION

Stream flow is manipulated in a system that sequentially and orderly changes uncontrolled movement of water to a controlled one directing it to a scheduled complexes. Such manipulation has caused and used technogeneouse complexes and structures mostly located upstream flow region of river to cause downstream channel adjustment or artificial effects. Kano river, Suka River in Minna are few smaller examples of human (engineering) manipulation system in Nigerian savannah that causes certain effects drainage basin so as to enrich and put in place artificial hydrological infrastructure such as dams and also control the entire scenario. Humans use land cover resources and engage in conversion to land uses and accompanying vegetation that also contributes to significantly to changed water run-off ratio, peak discharge and stream flow rates. This is a socio-economically based human manipulation of drainage basin which uses engineering and construction techniques to create systems that make channel sizes and general hydraulic geometry. This human manipulation system can simply be referred stream regime manipulation system. Physically, the system is a means of engaging drainage construction in hydrological and platform dynamics evolving all stream segments of river as detailed in the remaining part of the paper.

LITERATURE REVIEW

According to Stephen (2000), many dry land riers undergo marked downstream changes owng to factors such as infrequent floods, flow transmission losses, and typically few tributary inflows beyond the head waters. Along the Sandoer, Bunday (Sandoer-Bunday) and Woodford Riers on the Northern Plains of Arid Central Australia, downstream channel changes are broadly similar. In upland zones, small, rocky channels transporting sand and gravel gradually increase in size before entering the piedmont zones, where channels and narrow floodplains are confined by bedrock, alluvial terraces, or Aeolian dunes. In lower gradient lowland zones, channels and floodplains remain confined and, in the absence of tributary inflows, channel cross-sectional areas and discharges decrease downstream.

According to Petrosvki (2008), The Koros River Drainage basin is located in the eastern part of the great Hungarian plain, west of the Apuseni Mts., in the middle of the Pannonian Basin where the channels of the river and its tributaries are mostly meandering.

STREAM REGIMES MANIPULATION SYSTEM

A drainage basin has in it stream flow and channel characteristics that are in certain equilibrium in three stream regimes. When any of either upstream, middle stream and downstream is tempered with in ways as that has its upstream manipulated in Federal University of Technology Minna Bosso Campus exercised Mrowka, (1974) and Schumm (1977) stream flow has lies under human control that changes in its channel cross-sectional area, shape, sinuosity, and gradient as well as flood-plain characteristics. Construction of channel is most significant manipulation system that has been used extensively in developing hydrological structures such as dams,

reservoirs, etc. thus, such manipulation system was used in all the hydro-electric power supplies in Nigeria. Examples are as in Jebba River, Kainji Dam, Shiroro Dam and in even smaller upstream channelizing system such as in part of Suka River in Minna, Niger State, Nigeria. Certainly, drainage basins or the entire drainage basin is affected in certain ways such as general development of natural anthropology due to a changed morphology.

ANTHROPOLOGICAL AND MORPHOLOGICAL EFFECTS ON DRAINAGE BASINS

In Anderson (1970), interest in urbanisation on hydrological cycles, stream morphology and dynamics due to stream engines manipulation system and other similar ones, at great increase. The channel morphology and hydraulic geometry of stream channels (Troxell and Leopold, 1971) and others are under threat due to artificial control system. Specifically, watershed is disturbed, that causes variations morphologically and hydraulically as collectively emaciated in Simon (1992), Simon and Hupp (1992), Oyegun (1992), Church (1992), Pizzuto (1994) and Elliot and Gyetuai (1999).

STREAM REGIMES MANIPULATION SYSTEM EFFECTS REMEDIES

All scholars have confirmed that not more attention can be on numerical or technical evaluation of affected channel sizes and associated hydraulic geometry. This is to make good use of the new system. It is also pertinent to ensure judicious resources management. This shall be by measuring the impact of human activities on the natural as compared to the new system. By this approach, the philosophy of new geomorphological environmentalism of productive quality and environmental maintenance as in Mikesell (1974) can be enshrined. Another remedial action is that as the watershed attributes are altered, such should be reflected in the ways characters of the stream flow changes as well as the quality of the drainage basin as supported in Mrowka (1974).

It is clear that the construction of modern drainage system and human activities on the Suka River channel upstream have affected the runoff and channel stages negatively downstream area of the River during the wet season. However, the regime of the river has also changed from a low seasonal to a high seasonal type with negative changes in runoff and channel during the wet season.

CONCLUSION

Generally, however, in conclusion a constructed drainage in a manipulation system need to be properly managed and sustained to make the expected effect and derives in addressing problem of erosion and flooding in the water logged areas. It can also be recommended that let man finds out through examination what happens when man manipulates the regimes of the streams. Changes to the Suka River morphology have affected downstream uses, in particular navigation and abstraction for drinking, and irrigation. The river ecology is also been adversely affected.

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