

Managing ecological drought and flood within a nature-based approach. Reality or illusion?

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Water hazards events, emphasized by an improperly implemented water management, may lead to ecological degradation of ecosystems. Traditional water management has generally sought to dampen the natural variability of water flows in different types of ecosystems to attain steady and dependable water supplies for domestic and industrial uses, irrigation, navigation, and hydropower, and to moderate extreme water conditions such as floods and droughts.

Ecological drought can be defined as a prolonged and widespread deficit in available water supplies — including changes in natural and managed hydrology — that create multiple stresses across ecosystems, becomes a critical concern among researchers being a phenomenon much more complex than the other types of drought and requesting a specific approach. The impact of drought on ecosystem services lead to the necessity of identifying and implementing eco-reclamation measures which can generate better ecological answers to droughts.

Ecological flood is the type of flood analyzed in full consideration with ecological issues, in the analyze process being approached 4 key aspects: connectivity of water system, landscapes of river and lakes, mobility of water bodies, and safety of flood control.

As a consequence, both ecological drought and ecological flood represents high challenges for ecological sustainable water management in the process of identifying structural and non-structural measures for covering human demands without causing affected ecosystems to degrade or simplify. An ecological flood and drought control system will combine both the needs of the ecosystems as well as and flood and drought control measures.

The components ecosystems' natural flow regime defined by magnitude, frequency, duration and peak timing (high or low flows) interact to maintain the ecosystem productivity. This productivity can be impaired by altered flow regimes generally due to structural measures designed to control flooding. However, from an ecological perspective, floods are not disasters in the sense that human society typically views them.

Considering all previous aspects, it is clear that events like floods and droughts can't be avoided, but the hydrological extremes related to these events can be sustainable managed using a series of actions based on two inter-connected approaches: prevention approach and post-event management approach. The main objective remains the necessity of limiting the consequences of water hazards on socio-economic sectors but also the need of quickly and sustainable recovering after an event like this.

However, the question still remains valid: Ecological flood and ecological drought can be managed through a nature-based approach? This paper will focus on a theoretical analysis of these "ecological" hydro-meteorological events and will debate a possible nature-based approach for their sustainable management.