

Riparian woodland encroachment following flow regulation: a comparative study of Mediterranean and Boreal streams

Water development accompanying mankind development has turned rivers into endangered ecosystems. Improving the understanding of ecological responses to river management actions is a key issue for assuring sustainable water management. However, few studies have been published where ecological metrics have been quantified in response to various degrees of flow alteration. In this work, changes in natural distribution of trees and shrubs within the riparian corridor (as indicator of the ecological status of the fluvial ecosystem) were quantified at multiple sites along a flow alteration gradient (as indicator of impact) along two regulated river reaches, one Boreal and the other Mediterranean, each downstream of a dam. Based on the obtained relationships we evaluated differences in response trends related to local physico-climatic factors of the two biomes and regarding to differing life-forms. Woody vegetation establishment patterns represented objective indicators of ecological responses to flow alteration. We found different responses between life-forms. Both trees and shrubs migrated downwards to the channel after dam closure, but shrubs were most impacted under higher degrees of flow alteration in terms of lateral movement. In addition, our results show clear longitudinal recovery trends of natural patterns of tree and shrub distribution corresponding to a decrease in intensity of hydrologic alteration in the Boreal river. However, vegetation encroachment persisted along the entire Mediterranean study reach. This may result from a relatively low gradient of decrease of hydrologic alteration with distance from the dam, coupled with other overlapping pressures and the mediating effect of physico-climatic characteristics on vegetation responses.

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