

The influence of floodplain vegetation succession on hydraulic roughness: is nature restoration in Dutch embanked floodplains compatible with flooding safety standards?

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We present a recently published study (Makaske et al., 2011) in which we show for one of the Dutch Rhine River branches that large-scale riverine nature restoration and related vegetation succession may lead to up to 0.6 m higher river flood levels, because of increased hydraulic roughness. We hydraulically modeled future succession stages of embanked floodplain vegetation, following from present nature restoration plans for the 124-km-long river IJssel, and found flood levels exceeding the safety levels (related to dike heights). We used a 2DH hydraulic model that meets all requirements of the Dutch Directorate-General for Public Works and Water Management (Rijkswaterstaat). Our models took into account the river engineering measures presently carried out in the context of the 'Room for the River' project, which aims at enhancing the river discharge capacity in order to meet required safety standards. Our study shows that there is a pressing need for integrated hydraulic-ecological evaluation of river engineering measures and nature restoration plans in the Rhine embanked floodplains. An important conclusion also is that hydraulic evaluation of planned vegetation goals only is inadequate, because flow resistance of preceding succession stages may be higher.

Reference:

Makaske, B., Maas, G.J., Van den Brink, C. & H.P. Wolfert (2011) The influence of floodplain vegetation succession on hydraulic roughness: Is ecosystem rehabilitation in Dutch embanked floodplains compatible with flood safety standards? *AMBIO* 40 (4), pp. 370-376.