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An approach to assess the marginal environmental costs for flow regulation: an example in three European rivers

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In the last decades there has been a growing concern about water environmental costs. 'Polluter should pay' has been a phrase repeated in numerous policy-making processes. Water abstraction for Irrigation, Hydropower or water supply for Domestic or Industrial porpoises alters natural flow regimes impacting severely fluvial Ecosystems. The objective of this paper is to develop an evaluation of the marginal environmental costs for flow regulation. This approach is based on the idea 'who regulates flows should pay' and the amount to be paid should be proportional on the intensity, duration and frequency of the resulting regulated flows.
The methodology proposed includes three separated steps: (i) estimating the natural flow regime of a river segment through studying the hydrologic conditions before the river is affected by a determined anthropogenic impact, (ii) assessing the hydrologic alteration of the river segment according to the estimated natural flow regime, and (iii) calculating marginal environmental costs of water supply.
The three different case studies where the methodology was applied were the Esla River (Spain), the Upper River Tyne (England) and the Marna River (Norway).